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COLLEGE AND STATE

A Publication of the North Dakota Agricultural College, Fargo.

Vol. I. JANUARY-FEBRUARY, 1917 No. 1.

Application made for entry as second-class mail matter.

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Editorial Board

Arland D. Weeks..........Editor
C. B. Waldron, A. G. Arvold, Abbie L. Simmons — Associate Editors
A. H. Parrott.........Business Manager

College and State, which with this number makes its first appearance, will be a means of keeping the public better informed regarding the work done here. The college carries on a number of activities and it is hoped that this journal will succeed in reflecting the institution as a whole and serve as a medium for keeping in touch with friends and alumni, parents, the press, the schools and those interested in scientific and agricultural developments.

There is a modern tendency to relate the work of schools more closely to state, community and individual problems. It is in this spirit that this publication is sent out. It will aim to represent the college before the public, call attention to bulletins and scientific literature, aid those in charge of vocational schools or departments, apprise young people of opportunities for education, and assure parents that the college sees with them the need that students become thoughtful, considerate and right-minded, as well as thoroly trained for technical employments.

Education—What Kind?

The place of agriculture in the social economy is such that the farmer requires a many-sided training. He deals with machinery as well as with things that grow; he must protect himself in the markets; he must be able to voice his interests thru legislation, and he requires a schooling as well that results in acceptable standards of living. No greater mistake could be made than to propose an education for the farmer that would make him simply a skilled peasant, producing wealth without getting it and lacking culture to utilize it. The agricultural college, would it live up to the best vision, must become not only a great technological center, but must weave into the training of its students those ideals and forms of learning required for civic insight and economic sufficiency—for ability to discuss a question in public or dictate a letter to a stenographer.

Agricultural Teachers Propose Closer Cooperation with Agricultural College

At the meeting of the agricultural teachers' section of the State Education Association in November it was decided that there should be a closer affiliation between the agricultural college and those engaged in the teaching of agriculture in the public schools. In compliance with this a committee was appointed to confer with the officers of the college with the idea of outlining a plan of procedure.

It was proposed that each of the agricultural teachers prepare a monthly letter relating to his work and especially outlining any phase of it that might be of general interest to others engaged in this same line of work. These letters are to be sent to the agricultural college, where they will be edited and sent out to the different agricultural

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teachers in the form of a circular that will also include any matter that might be of interest or importance to them In this way every teacher will know what all of his fellow-workers are doing and will be able to profit by their experience as well as by any suggestions that can be offered by the college. Until special provision can be made for carrying on this work, it will be handled through the office of the dean of agriculture.

The correspondence with the different teachers was begun during December. The first circular will be sent out in February.

In addition to the work above outlined it is proposed to have the teachers meet at the agricultural college once or twice a year in general convention to discuss matters particularly relating to their work and to look over the experiments and class work at the college.

The Educational Survey

Of the many interesting things contained in the first biennial report of the state board of regents of North Dakota nothing is more vital to the welfare of the agricultural college than the recommendations (taken from a brief of the survey commission) quoted below. Whether these should or should not be adopted is a question for the people of the state to decide.

I.

"The School of Education at the University and the Department of Education at the Agricultural College should be sufficiently enlarged to enable them to prepare high school teachers, school superintendents and supervisors both for elementary and high schools and expert special teachers in sufficient numbers to supply the demands of the schools of the state and special teachers of agriculture and domestic science and other industrial subjects should be prepared at the Agricultural College."

II.

"Graduate work at the University and at the Agricultural College should, for the present, continue to be limited to the requirements for the master's degree, and each institution should give graduate instruction only in those subjects which are considered major subjects at that institution. Graduate courses in education may be offered at each institution."

III.

"Instruction in home economics should be given at both the University and the Agricultural College. Except for the purpose of preparing teachers of domestic science for high schools as elsewhere indicated, there should be only service courses in home economics at the University. The Agricultural College should offer both major and professional courses in this subject."

V.

"All mining engineering and all courses above the first two college years in all other forms of engineering, except agricultural and industrial engineering, should be given only at the University. Courses in engineering at the Agricultural College should be limited to agricultural and industrial engineering and to such work in mechanical and other forms of engineering as can be done in the first two college years."

VIII.

"Fully three-fourths of all the people of the State of North Dakota who are engaged in gainful pursuits are employed in agriculture or in occupations connected directly therewith. The agriculture of the state is carried on by farmers, a very large proportion of whom operate their own farms. These facts and others presented in this report indicate very clearly the importance of agriculture in the vocational education of the state and the need of instruction and training for large numbers of men and women to the extent which will enable them to operate their own farms intelligently and successfully, as well as the need of highly technical training for a few. The Agricultural College should devote its energies and means to instruction in agriculture and the immediately allied subjects in proportion to the needs herein indicated."

IX.

"Courses in liberal arts and science at the Agricultural College should be considered only as service courses and no degrees in the liberal arts and sciences should be given here."

X.

"There does not seem to be at present sufficient demand for architects and architectural engineers in the State of North Dakota to justify the maintenance of a school or of extensive courses in architecture or architectural engineering, either at the University or at the Agricultural College. Therefore instruction in these subjects at the Agricultural College should be only of an elementary nature and should have special reference to farm buildings, warehouses, school buildings for rural and village communities and other similar buildings."

XI.

"Instruction in pharmacy should be continued at the Agricultural College and standards for admission to and graduation from this course should be raised as rapidly as possible to the completion of a full high school course of four years for admission and a minimum of two years' instruction for graduation."

XII.

"The President of the Agricultural College should have general control of the Experiment Station and of its branches and be held responsible to the Board of Regents for their management."

XIII.

"Investigators, men and women engaged in research work at the Experiment Station at Fargo, should, except in case of those whose duties are such as to make it inexpedient, be expected to teach some classes in the College; and the Experiment Station and its farms and laboratories as well as the laboratories of the regulatory services should be used under necessary restrictions as teaching agencies for undergraduate college students and as research agencies for graduate students."

XIV.

"The Agricultural High School at the Agricultural College should be discontinued as a preparatory school by dropping the lowest class each year, beginning with 1917, so that after the beginning of the school year 1921 there will be no preparatory classes at the college."

The Milling Value of the Different Grades of Wheat

Two bulletins have been issued by the experiment station of the agricultural college during the past year on the milling value of the different grades of wheat. These are bulletins No. 114 and No. 119. The publications are based upon work done at the small flouring mill at the agricultural college.

This work was started in 1907 to determine not only the milling value of the different grades of wheat but of the different varieties of wheat that were then being marketed in North Dakota.

In connection with the manufacture of flour from the different wheats exhaustive baking tests were carried out to determine the actual value of the flour. Contrary to the usual belief, which is naturally based upon the selling price of wheats, there was no marked variation in loaf volume for the different grades of wheat of the same variety. In the case of the Blue-stem wheat, for instance, the volume of the loaf made from grade No. 1 was slightly smaller than that from grade No. 3 or No. 4, and about ten per cent less in volume than that made from the grade known as "rejected."

In the Fife wheat there was no uniform difference of volumes in loaf for the different grades, tho that of grade No. 4 gave a slightly larger loaf than that of grade No. 1.

In both the case of the Velvet Chaff and the Durum, the lower grades gave somewhat larger loaf for the same amount of flour. This would show that the milling value of wheat of the lower grades is fully equal to that of the higher grades in volume of loaf.

In the matter of color for both the Blue-stem and the Fife, the loaf made from the higher grades scored about ten per cent higher than that made from the lowest grades. In the case of the Velvet Chaff and Durum, there was no advantage in favor of the higher grades.

In the item of texture there was even less difference than in that of color, the average being nowhere greater than three per cent.

When these figures are compared with the market prices of the same grades there is found to be a striking discrepancy. Taking the average price of the different grades of wheat from the years 1907 to 1914, inclusive, and assuming that in the milling of one thousand bushels of grade No. 1 there is a gain of $251.43, not counting the cost of manufacturing or other mill charges, there would be in the case of grade No. 4 a gain of $325.95, for the same amount of wheat; and in the case of rejected a gain of $402.04. Assuming that there is an average profit in milling grade No. 1, it would seem that there is an added profit of something like $150 for milling an equal amount of grain graded as rejected.

In comparing the still lower grades of wheat, those known in the market as the feed grades, there is still much greater difference between the market value and the milling value. For instance, if 1000 bushels of No. 1 Northern were sold on a certain day, the price received by the farmer would have been $1526.75; while on the same day the price of the grade known as "D Feed" would have been $653.01. The mill products from the first lot of wheat would retail at Fargo for $2558.47, while the products from the poorer grade would retail for $2107.03. This would make a total income over the cost of the wheat of $1031.72, in the case of No. 1 Northern, and of $1454.02, in the case of "D Feed" wheat, which in the beginning cost less than one-half of the No. 1 Northern.

It is needless to say that these publications have created quite a stir in farming and milling circles. Efforts are being made to have a federal grading system established, based upon the results of these findings.

Present Issues in the Teaching of English

The following account of discussions at the recent national meeting in New York City of teachers of English will be of interest to all connected with education in North Dakota. Language is the very center of teaching materials and the issues under consideration by teachers of English thruout the country are timely and important. Professor A. E. Minard, head of the English department of the North Dakota Agricultural College, contributes this writeup, having attended the meeting as a director of the national council of English teachers.

English teachers of the country are alive to their many problems, to judge from the attendance and the spirited discussions at the recent sixth annual meeting held in New York, Nov. 30 to Dec. 2. Several hundred teachers of English from colleges and normal schools, high schools and elementary schools left home at the Thanksgiving season to learn from committees and special investigators the present status of some of the more acute issues.

Are the colleges giving future teachers of English the best training for their work? The facts so far compiled make an affirmative answer to this question difficult. Thesis subjects in too many cases take the teacher quite away from the field of interest of his pupils. In other cases the work is too general. The study of composition, literature and the theory of education is not sufficient. Specific courses in method, now not common, will enable young teachers to take up their work with less fumbling at the expense of the pupils. This instruction in method should be given by experienced English teachers.

Is the English course in the high schools as at present generally organized satisfactory? Three important changes are being carefully considered and in many cases have been already adopted. First, the separation of literature and composition with approximately half time and separate marks for each was warmly defended by Mr. McComb of Indianapolis and by Mr. Miller of Detroit. This plan is already in force in North Dakota. The older plan of mixing composition and literature evoked no support. Those using the new plan differ as to units of time; some alternate weekly, some monthly, and some by terms or semesters as in our own state. A second important change that is gathering headway is to do fewer things and to do them better. What is essential in grammar, in rhetoric, in the history of literature? If grammar is to stay it must produce results. We must get away from the fetish grammar of classification and get to the grammar of function. One school in Kansas has taken grammar out of the grades entirely and finds that when the pupils take it up in high school they make a showing superior to that of pupils who spent time on it in the grades. If grammar itself is not to be eliminated, at least much of what is now consuming the pupil's time is to be discarded. With reference to the history of literature, too, Elizabeth Lodor of the William Penn High School of Philadelphia asked for a decreased emphasis, that more time might be given to literature itself. With this request Mr. Fairley of New York warmly agreed. What history is necessary should be taught mainly in connection with the study of literature itself. Our North Dakota course of study, giving the history of English and American literature but a half year, is thus approved.

A third growing change is the increasing emphasis on oral English. The council passed a resolution asking that oral English be given specific recognition in college entrance requirements.

Are the standards for the measurement of English work sufficiently definite? Nearly all agree that they are not. Consequently all English teachers will be glad to know that Columbia University is now in the midst of important studies that promise to throw light on this problem. A committee was appointed, of which Allan Abbott of Columbia is chairman, to bring in a report next year, if possible, on definite standards for the different grades of English work.

The committee on elementary English in the United States, of which Professor E. M. Hopkins of Kansas is chairman, is hard at work organizing its voluminous material to be published ultimately by the United States Bureau of Education. It is a matter of congratulation that North Dakota will be represented in this report as a result of the efforts of Miss Beatrice Olson of Ellendale.

Most important is the announcement that the report of the joint committee on the reorganization of high school English is about to be issued by the bureau of education in a bulletin of 250 pages. This committee, of which Professor James F. Hosic, secretary of the council, is chairman, represents the National Education Association and the National Council of Teachers of English. The report, which has been in preparation five years, will make very definite the best tendencies in high school English today.

Mathematics of Investments

Irvin W. Smith
Department of Mathematics,
North Dakota Agricultural College

With few exceptions colleges and universities have hitherto made no provision for courses in mathematics adapted to meet the needs of students training for commercial careers and public service. However, in recent years the closer study of business methods and the extension of governmental control over many forms of industrial and financial activity have greatly emphasized the value of what is sometimes termed "political arithmetic."

In an attempt to cover the field of mathematics of investments some of the more important questions relating to the theory of interest and its application to the larger affairs of modern everyday life are brought together—discount, annuities, extinction of interest-bearing debts by periodical payments (generally known as amortization), valuation of bonds, sinking funds and depreciation. Building and loan associations and insurance, especially life insurance, are treated both from a theoretical and practical viewpoint.

Some of the topics mentioned may be familiar to the reader but there is a lack of appreciation, generally speaking, of the application of the fundamental principles involved. While from a mathematician's viewpoint the necessary mathematics may be quite simple in many instances yet the application is somewhat complex and not always easily understood.

The subject of compound interest is a familiar one by name at least and so far as mathematics is concerned it is not difficult. Its application to finance in the matter of savings banks has been one of the main factors in the accumulation of the present deposits, which amount to nine billion dollars.

If we add a periodic payment to our element of compound interest we have at once the subject of annuities. To the mathematician annuities have long been known, yet the application of the fundamental principles of annuities is of more recent date and forms the basic element of life insurance, building and loan associations and savings accounts.

Owing to the present activity in matters relating to farm loans and farm loan banks one of the most timely questions in the mathematics of investments is that of amortization or the extinction of interest-bearing debts by means of periodical payment. The term amortization has come to mean, in its broadest sense, the extinction of a debt regardless of the means employed. However in this instance is meant the repayment of a debt, principal and interest, in equal annual installments. A loan is made and it is agreed that a full amount, which must be in excess of a year's interest, will be paid each year. Of this fixed amount a portion goes to the payment of interest due, and the balance is applied toward the reduction of the principal. For example, one makes a loan of $1000 on which 6% interest is to be paid, and it is arranged that $100 shall be paid each year. At the end of the first year an interest payment of $60 will be due, leaving $40 to apply toward the reduction of the principal. The principal for the second year will be $960, and the interest payment will be $57.60, so that $42.40 will be available for the reduction of the principal. The process continues in this manner (in this case thru some sixteen years) until the debt is entirely repaid.

In the foregoing example the amount of the annual payment was given, and the time required to pay the debt was unknown. Most frequently the time and the rate of interest are given and the amount of the annual payment is unknown.

If A denotes the face of the debt, n the time and i the rate of interest, then the annual payment, R, is given by the formula:

$$R = \frac{Ai}{1-(1+i)^{-n}}$$

For the purpose of keeping a record of the items in the amortization of a debt it is advisable to construct a table which will show the following things: the principal remaining due, or outstanding, immediately after the annual payment, the interest for the interval, and the amount of principal repaid.

Such a table will be most easily understood by examining a concrete case and below is given a table showing the amortization of a debt of $1000 with interest at 6% payable annually, in five equal annual installments.

Year	Principal outstand'g at begin'g of year	Interest at 6%	Annual Payment	Principal repaid
1.	$1000.00	$60.00	$237.39	$177.39
2.	822.61	49.35	237.39	188.04
3.	634.57	38.07	237.39	199.32
4.	435.25	26.10	237.39	211.29
5.	223.96	13.43	237.39	223.96

As a further illustration suppose the same conditions are given as in the preceding illustration except that the debt is to be repaid in 10 equal annual installments, and we have the flolowing table:

Year	Principal outstand'g at begin'g of year	Interest at 6%	Annual Payment	Principal repaid
1.	$1000.00	$60.00	$135.87	$75.87
2.	924.13	55.45	135.87	80.42
3.	843.71	50.63	135.87	85.24
4.	758.47	45.51	135.87	90.36
5.	668.11	40.09	135.87	95.78
6.	572.33	34.34	135.87	101.53
7.	470.80	28.25	135.87	107.62
8.	363.18	21.79	135.87	114.08
9.	249.10	14.94	135.87	120.93
10.	128.17	7.70	135.87	128.17

The first and most important check upon the accuracy of the mathematical work in constructing an amortization table is that the sum of the amounts in the column for "principal repaid" should be equal to the original principal or debt. In the second place the total interest paid should equal the interest for one year on the amount found by adding together the amounts in the column of "principal outstanding." Finally the total interest plus the original principal or debt should be equal to the total sum paid.

Another very important topic in the mathematics of investments is that of depreciation. Tho a debatable subject in many respects its usefulness is coming to be appreciated by public utility commissioners in making an equitable adjustment of rates, the basis of which requires some sort of quantitative determination of depreciation. Also manufacturers are giving careful attention to the annual upkeep cost due to depreciation. Likewise the cost due to depreciation in farm equipment is receiving a deserved consideration.

A careful mathematical analysis of depreciation is hardly within the province of this article. However, such problems as finding the amount that must be set aside annually for a depreciation fund to provide for the replacing of an asset worn out by use; finding the annual payment to the depreciation fund where the depreciable property consists of several kinds of assets having probable lives of various lengths; determining the composite life of a plant composed of several parts having different probable lives; and determining the wearing value, at a given time, of an asset whose probable life is known, are problems which are considered and mathematical formulas for their solution are derived.

The valuation of securities such as first mortgage bonds is given careful consideration. Large farming companies and cattle companies are issuing such bonds secured by a mortgage upon large tracts of land to obtain capital for doing business. These bonds are issued in denominations suitable for the investor and the problem of financial importance is the determination of the purchase price in order to yield a profitable rate of investment to the purchaser.

There are other phases of the mathematics of investments equally important but it is assumed without further discussion that the reader has gained some idea of what is meant by the application of mathematics to the field of investments; that one of the results to be obtained by such knowledge is independent thinking on the part of either the investor or the borrower, and that a knowledge of the principles of sound finance should be a part of the training of the young men who are going out from our colleges and universities to become leaders in the business world.

Rural Credits Work

Dr. James E. Boyle

As soon as the federal farm loan act was passed the director of the experiment station had a series of twelve articles prepared and sent to the press, explaining every detail of the law. The response to these articles was noteworthy. Letters poured in from every corner of the state, asking for further particulars of the law.

Here is a sample of the letters which have come in:

"..............................N. D.,
Dec. 23, 1916.

Dear Sir:—

I saw in the LaMoure Echo that the federal farm loan board is going to open in January. I bought 80 acres of land from A................ B................ four years ago. The first year I got nothing, I burned the whole thing. The next year I got so I could straighten up for both these years. Now the next year, again nothing, and then the fourth year I got a good crop and cleared off $1000 debt and $500 on the 80 acres. Now this year I got nothing, and the land was supposed to be paid for last fall. But I only paid $500 down and they said it could run on. When I come to straighten up they charge 10 per cent on the sum and there is $2000 and interest. I can't possibly raise it, and they say they will foreclose. If you can help me out, do it soon. Please answer as I don't know what to do. I don't like to lose it, as I have paid five hundred dollars on it and interest for three years. This is the first year I can't pay interest.

Yours respectfully,
C................D................"

Local Associations.—Since loans can only be had (for the first year) thru national farm loan associations, the station has furnished printed instructions for the organization of these locals, and already many have been formed or are in process of formation. County agents assist in all counties now having county agents. In other counties the station helps in organizing the locals.

College Extension

A series of illustrated lectures on rural education is offered by Mr. A. P. Hollis, college extension lecturer. These include the following titles: Making the most of farm boys and girls, a lecture on consolidation; Riches from rubbish; Learning and earning; The health of rural school pupils; Agricultural clubs and contests; An agricultural college in action; The rural church and rural school as social centers. The lectures have met with favor wherever given, being distinctly adapted to North Dakota conditions. The work of Mr. Hollis in promoting consolidation of rural schools has been particularly effective.

The extension work also includes a number of aids for rural education. A slide and film exchange is maintained for the free use of schools having suitable equipment. A form of electric light has been produced that permits films and slides to be exhibited in rural communities without regular electric light service. Several departments of the college cooperate in the extension service. Plans for tree planting on school grounds, package libraries, and collections of specimens for agricultural instruction may be secured thru the extension service. Posters and bulletins on farm topics are also supplied.

The Rural Lyceum is a series of low-priced lectures and entertainments for small towns and rural communities, by talent hired for the purpose.

Are Teachers Wanted?

Courses are offered at the North Dakota Agricultural College fitting students for teaching vocational subjects, such as agriculture, mechanic arts, home economics, and science. Some are especially fitted for principalships and teaching positions in consolidated schools and for extension work. The preparation of industrial teachers includes thoro specialization and general and educational training. The committee on recommendations would be pleased to correspond with employers and will recommend suitable candidates if available.

Campus and Alumni

A four weeks course in creamery butter-making will be offered from January 29 to February 24, under the direction of J. R. Keithley, professor of dairying.

Judge Marcus A. Kavanagh of the superior court of Chicago recently addressed the patrons of the Citizens' Lecture Course in the college armory upon the subject, "Traitors to Justice."

If the legislature accepts the recommendations of President Ladd a new agricultural building will soon be a reality on the campus as well as an addition to Science Hall.

The alumni association held its first semi-annual meeting in The Little Country Theater, January 4. Representatives of classes from 1904 to 1916 were in attendance. Roy Dynes, 1914, was elected secretary and treasurer, to succeed Levi Thomas, resigned. Resolutions endorsing the work of President Ladd and for John H. Worst for president emeritus were passed. Over forty alumni attended.

Walter Baumgartel, 1916, has been appointed editor of the alumni edition of the Spectrum.

The alumni council, consisting of the presidents of the college alumni association, the agricultural and manual training high school alumni association, the industrial course alumni association and the country life association will hold a meeting the first week in February for the purpose of perfecting plans to keep all former students in closer touch with the work of the institution.

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College Speakers

First and last a good many speakers come to the college, some of whom come and go without notable influence upon audiences. But others, characterized by singular freedom and sincerity, leave an influence traceable for days, weeks and even years in the thought and talk of those who hear them; Walter Rauschenbusch, Frederic C. Howe and Lincoln Steffens belong here. Such provoke thought; they challenge, and this is the best sort of service, for it overcomes indifference.

Destructive Occupations

There are, says J. Adams Puffer, who spoke recently at the college and in the city, destructive occupations, such as make the world not better but worse. He names the saloon, patent medicines, the unfaithful newspaper and the kind of real estate operations that have caused millions to live in slums, with speculators in possession of suburban property, held for unearned increment. Mr. Puffer thinks, too, that an excess of doctors, lawyers and ministers is an evil.

Students and Courses in Agricultural Colleges

The report of the commissioner of education of the United States for 1916 gives some interesting facts regarding students and courses in fifty-two agricultural and mechanical colleges for white students. The course in agriculture enrolls the highest number of students. Next in number of students is the course in general science. The following table shows the number of students in regular college courses in agriculture, science, and home economics in fifty-two institutions for white students for the year 1915:

Agriculture	13,833
Horticulture	1,053
Forestry	989
Veterinary Science	1,294
Household Economics	4,431
Mechanical Engineering	4,189
Civil Engineering	3,289
Railway Engineering	336
Electrical Engineering	3,335
Mining Engineering	713
Chemical Engineering	871
Sanitary Engineering	495
Textile Engineering	99
General Engineering	2,383
Architecture	844
Chemistry	715
Pharmacy	249
General Science	4,842
Total	43,960

North Dakota Beautiful

C. B. Waldron

When considered in all its relations and aspects there is nothing of greater human importance perhaps than the landscape—that sum total of all natural objects small and vast amid which most of our lives are passed and from which our sustenance comes.

It is the right and privilege of any people and in the highest sense their duty to preserve the native charm that most landscapes possess, making school grounds, farmsteads, roadsides and villages conform to the general spirit that characterized the landscape in the beginning.

There are few early comers to North Dakota who have not seen and felt the restfulness and majesty of the great sweep of the prairies stretching away in endless unbroken lines or blending with the horizon in forms as bold and sweeping as of the clouds that seem to rest upon them.

And not a few who have been charmed and impressed by the dignity and immensity of the earlier landscape view with regret the inevitable and not altogether beautiful changes that have been wrought thru the advent of man.

No one can consistently deplore the coming of man to any place where a livelihood awaits him, but we might wish and fervently pray that some of the creations of men could be more in keeping with that portion of the earth with which they are associated. Most buildings seem as little related to their surroundings as tho they had dropped from a clear sky and even many of the tree plantations look almost as foreign and out of keeping.

The chief structural characteristic of the open prairie lies in its horizontal lines and for that reason all houses built upon it should be low and broad instead of tall and narrow.

They should moreover be fitted still more intimately into their surroundings by native shrubs like the sumac, red osier, wild thorn, silver bush, high bush cranberry and wild rose, planted about the foundations.

Native vines like the wild grape, woodbine and wild cucumber may be used to add a still further touch of naturalness.

A windbreak upon the prairie is highly desirable but it need not be made up wholly of narrow straight trees like the willow and cottonwood. Along the sides of these a natural grouping of ash, oak and elm, skirted with choke cherry and wild plum, will make the plantation seem natural and not altogether at variance with such native bits of woodland as one encounters along the streams or in the rugged places where the annual prairie fires failed to gain entrance.

And lest we forget the things that charmed us before the enterprising but ruthless plowman doomed to oblivion the acres of beautiful wild flowers, we might reserve a spot where the pasque flower and gentian and red lily, together with their scarcely less lovely summer companions, might live and bloom on unvexed and untrammeled.

Does this all mean so little that we can afford to ignore it?

Those who have the means travel far merely to catch glimpses of beautiful scenery, for the love of the beautiful is a natural human instinct.

They might derive greater benefit and profit from a bit of beautiful scenery of their own making, more especially since the greater part of their lives will be spent in its presence.

We who have known North Dakota beautiful feel that in her subjection by the eager, thrifty pioneers who covet her treasures there should be much of the old charm retained, as is befitting people of taste and refinement.

Our prairies, if rightly developed, will do more than make us a living or even yield us wealth. They will supply us with what makes life full and satisfying, ministering to our love of the beautiful and appropriate in whatever way we go.

Our farmsteads, school grounds, highways and towns may all be developed in harmony with the restful, vast and dignified spirit of the prairie.

Engineering and the State

R. H. Slocum

Professor of Civil Engineering, North Dakota Agricultural College.

The fields of transportation of persons and materials, production and transmission of power, supply of water, gas, electricity, heat and refrigeration and development of mine and forest products offer ever increasing opportunities to the engineer. The opportunities for service will increase more than in a direct proportion to population served because of its congestion and the communication between states and nations. In this respect it is on a different basis from the older professions. There seems to be little reason why the demand in law, medicine, theology and even pedagogy should increase more rapidly than the population. With the engineer exactly the reverse is true and it has been true ever since the invention of the steam engine, which led to the manufacture of power and the multiplication of man's productive capacity.

In the past the engineer has been concerned with getting results. The results have been obtained sometimes with undue waste and destruction of the natural product. In the future the natural product will be a greater economic factor in the final result and must receive more careful attention. A careful and systematic study of the use of all the materials and processes should now be made. Some of the older branches of engineering still depend more or less on the rule of thumb. Engineering science is for the most part comparatively new and much of it is still crude.

However, it is remarkable to observe the nicety with which things in nature harmonize—the simplicity with which their properties may be used. Reinforced concrete may be used as an illustration. Steel has those properties of strength lacking in concrete and yet from the nature of concrete it can be formed into the desired shape and molded around the steel to bond to it effectively. The steel is thus protected from the weather, corrosion and extreme heat. Yet all of these features would be as naught and the structure destroyed by internal stresses were it not for the equal expansion and contraction of the two materials for changes in temperature.

The impression should not prevail that engineers, manufacturers and transportation companies have been idle and negligent of their opportunities to add to the fund of engineering knowledge. Evidences of deep study and diligent investigation are at hand.

New devices have been developed and old ones improved, materials have been put to new uses, and precedents broken away from in design and construction. Discoveries in one field have made possible long dreamed-of projects in others. Large centers of population have required, and at the same time made financially possible, improved water supplies of magnitude. Discoveries in science have been turned to service in matters of public health. The wireless telephone and telegraph have become practical realities. Gas engines have made aviation possible. Steel alloys have modified bridge design. Tungsten filaments have effected economy in electric lighting. The "monolithic" brick pavement supersedes the old form. Sanitation made the Panama Canal possible without an unbelievable death toll. Water power transformed into electricity and used to draw trains thru mountainous territory shows a careful study and systematic use of the materials at hand. Revised location and large expenditures for structures to shorten the running time of trains show that the engineer has a full appreciation of the value of time as well as that of money and materials. From every viewpoint it is apparent that he has kept abreast of the times and done his full share for the progress of the race.

However, political, economic, social and financial conditions, which have changed in recent years, are to undergo even greater and more rapid changes in the future. If the engineer is to continue his useful and effective service to mankind he must not be oblivious to the new conditions. He must carefully compare the present with the past and in other ways establish a basis from which to plan wisely for the future.

If this is true of the practicing engineer it is doubly true of the engineering college, where preparation must be made to direct the work of future students. Laboratories must be equipped and facilities for and systematic methods of instruction developed to keep pace with new conditions in engineering practice and to train men for new activities. Better yet if the instruction in engineering could be based on engineering science, fostered by engineering experiment stations, to set the pace for engineering practice. The advisability of this arrangement is strongly emphasized by the phenomenal success of the industries in Germany, where the value of technical instruction is recognized and experimentation encouraged by the government.

The conditions for engineering in North Dakota are not essentially different from those in other states, tho the future here is possibly more promising because of the probable rapid growth in population. The rate of growth of population in the United States far exceeds that of any other country, with the possible exception of Russia, and the rate of growth of population in North Dakota is much greater than the average for the United States. The natural result of an increase in population is an increase in work for the engineer.

The city manager form of government is an example of the changing order. The technically trained engineer with a broad outlook on affairs and a faculty for organization should make almost the ideal city manager. Engineers have been criticized for not having a broad outlook. The present tendency is to grow away from this condition and combine the broad outlook with capacity for details.

There are many specific outstanding engineering problems in North Dakota. These may be grouped under three heads, altho each item may have its influence in another group. The groups are (1) convenience and sanitation, (2) transportation and (3) wealth production.

Improved standards of living are directly responsible for the first group. Into this class naturally falls the "clean" water supply, both public and private, the disposal of sewage and other household waste, telephone and electric light service and improved housing conditions, such as sunlight, air, heat insulation and devices which lighten the labor of housekeeping. Climatic conditions and the amount and distribution of rainfall are local factors in the problem of water supply and sewage disposal. Transportation logically includes the steam and electric railways, waterways, and the public highway as a means of travel. Railways will be developed as necessity demands. A north and south line might greatly facilitate traffic and open desirable markets in addition to those already available. Waterway transportation probably will never develop to become a vital factor in the commerce of the state.

A thing much in the mind of the public is the public highway. The popularity of automobiles has brought the campaign for good roads to an immediate success, which culminated in federal aid for roads.

North Dakota's marketable products have been practically limited to raw materials. Wealth production may be materially increased by increasing the raw product but more particularly by turning raw into finished product.

Irrigation and drainage will aid

materially in increasing the yield of grain. The greatest gain in wealth is to be made by the development of clay and lignite deposits and the use of flour mills and packing plants to produce a finished article from the raw material of the farm.

Lignite in the raw state is not a particularly desirable or cheap fuel. However, by means of the gas producer and high voltage electricity, power may be supplied over a wide area. Briquetting and attendant processes have great future possibilities and will doubtless quickly come to the fore under the stimulus of commercial needs.

The clays of the state seem particularly suited to a wide variety of products. Plants are in operation which make a high class of building brick. Industries should develop which would produce an excellent pottery, a serviceable and lasting drain tile and a high grade sewer pipe, flue lining or fire brick. The relative position of fuel and clay should make this unusually profitable.

The opportunities for the engineer are not wanting in North Dakota whether in the line of technical service for the individual, city, county or state or in technical or managerial positions in the development of industries. The man who is trained to observe, think logically and constructively and act decisively will make a place for himself. The real engineer has that broad conception of life which enables him to adapt and organize the forces of nature effectively to the service of his fellows.

High School Agriculture and the Farmer

Homer Dixon, '15

Instructor in Agriculture, Perham, Minn.

The attitude of the farmer toward the course in agriculture in our schools is with a few exceptions usually one of complete indifference. It seems that the high school departments of agriculture have been placed there by the state and the local boards without the demand of the farmers. That is, the farmers themselves have not asked that these courses be established, and when they are established the farmer is very slow in getting in touch with them.

It is often true that the farmer feels that he knows more, ten times over, than the young fellow who has taken a position as instructor in agriculture in his local school. And often because of the farmer's advanced age and long experience this is at times partially true. However, there are always ways in which the farmer may be aided. Because of this attitude the instructor is brought to feel that the farmers are not interested in his work, and he thinks harsh things of them. It is very true that the instructor can learn a good deal from the farmer, but it is also true that the farmer can learn from the instructor. Usually it is merely because of a misunderstanding on both sides that the two fail to come together in a cooperative way. There are very few instances where the farmer and instructor do not get along after they once understand each other.

There are always a number of mistaken notions resulting from false rumors which are spread around upon the installation of a course in agriculture and these tend to make the farmer a little suspicious. Often it is the tax question that bothers. If the farmer would forget the "can't show me" attitude and take up the attitude of having the instructor help him perform certain essential parts of his farm work, such as seed testing, milk testing, etc., he would soon find that the young fellow in the high school could help him quite a little. It is not the desire of the high school men to "show" the farmers, so much as it is to help them carry on certain lines of their work in a more thoro way. The farmer is a busy man and often does not have the equipment available for certain kinds of work which the high school man could do for him. Oftentimes the farmer is not acquainted with breeders of stock as is the high school man, and in many cases aid secured along this line would lead to the importation of better stock into the community.

It is a fact also that farmers will send their boys to high schools which have the course in agriculture, and tell them to take the commercial course, and often the English or Latin course. Now it is true that the farmer of to-morrow must know a great deal about business methods, bookkeeping, etc., and it is also necessary that he should be able to talk and read English in an easy manner. These may both be obtained in connection with the course in agriculture, so why not combine them, instead of leaving out the agriculture?

Many of the boys offer the argument that they are not going back to the farm, that they intend to take up merchandising or real estate. It is difficult to make them see that these occupations are based upon agriculture, to a greater or less extent, and that a four-year course would be an aid to them in these lines of work. Many of the boys who are going back to the farm do not take the work merely because of the fact that they feel they have had enough work and experience in farming already. It is very seldom, however, that you find a boy planning to take up engineering after he leaves high school who takes everything in the curriculum except physics, chemistry and mathematics. Why does the boy from the farm slight the agricultural course? We believe it is because he is not encouraged to take it by his parents.

A peculiar instance has been brought to our attention of a young man who is very desirous of securing an education along the lines of agriculture. He wanted to go to high school and his parents were afraid that if he did he would soon come to know so much that he would not want to stay on the farm, and they would be left without him. There is another brother who could do the work at home and make it possible for the boy to attend. The boy in this case started and from all reports was doing very well, altho he received no support from his parents. He secured a place where he could work for his board and room and got along nicely until after Christmas, when he stopped going to school. Inquiry showed that the other brother had hired out to a neighbor for his board and room over winter and so the boy who wanted to go to school had to go home to do the chores. It looks like a put up job to take the boy out of school. Why do parents do this? Here is a boy who wants to farm, intends to remain on the farm the rest of his life, but at the same time he wants to be prepared to do his work as it should be done. Because of this fact his parents do all in their power to oppose him in his ambition. They could well afford to put him thru eight years of agricultural training, and the boy would return to the farm at the end of that time, but they will not do it.

It would not be fair to close this article without telling of the many who do work in cooperation with the high school instructors and do send their boys to take the course in agriculture. There are a good many who do this, but they are not in the majority; if they were, the high schools would not be large enough. These are the people who keep up the spirits of the instructor, make him feel that his work is a little worth while, and so he keeps on plugging. Time, however, is going to make a great many changes. The farmers are going to see that the work of the high school agricultural departments is important and then they will support it, and once a farmer takes this view he sticks to it, and that helps.

College Dramatics

Since the theatre necessarily must be one of the great social factors in any community, it behooves the community to see that wholesome plays are presented which will not only entertain but also elevate the tone of the audience as regards high ideals of conduct, a better understanding of manners and a greater appreciation of beauty.

Within the past few weeks three plays have been presented at the Little Country Theater, which productions have been helpful along the lines suggested. "The Servant in the House," by Charles Rand Kennedy, one of our most noted American dramatists; "The Raindrops," by Matthias Thorfinnson and Eggert V. Briem, two students of the college, of Icelandic extraction; and "The Vestal Virgins," by Abbie Louise Simmons, assistant professor in English at the same institution. These plays have all been given under the directorship of Mr. A. G. Arvold.

"The Servant in the House" was presented by the Edwin Booth Club. Everyone in the cast from the first moment of the play shed the proper atmosphere of this truly ethical drama upon each individual in the large audience. It was one of the most artistic performances ever given by amateurs in the city of Fargo. Its influence upon the many students in attendance will be a lasting one. That Christ-spirit pervading the play is revealed not only thru Manson, the servant in the house, but also thru Robert, the drainman, and finally thru the rector of the infected church, when he himself is ready to risk his own life with that of his long-neglected brother to go down amidst the filth that underlies the church's foundation. Then was brought vividly before every spectator in that audience that only thru the spirit of brotherhood can righteousness prevail. Many persons had the privilege of seeing this unusually uplifting drama, since three performances were given at the Little Country Theatre and one enactment on the stage of the Masonic temple in Fargo.

The Icelandic association connected with the agricultural college presented "The Raindrops" before the council of the women's federated clubs of North Dakota. The play is a rare product to come from the hands of two young men who have had no special training in dramatic technique. Errors in technism were readily pardoned since the portrayal of Icelandic manners was so interesting. The beautiful story of the "raindrops," interwoven into the play, delicately portraying the plot, was written by Mr. Briem. The unique feature in connection with the production, however, was the painting of the Icelandic scenery by the young authors who never had used a brush before. The large rear canvas represented the mountains, one being snow capped. A waterfall tumbling down the mountain side was visible, now here, now there, in its rapid descent. Moreover, the exterior of the Icelandic home, and the side scenes were also the work of the young producers. "The Raindrops" will have another hearing sometime this spring, when the many who have desired to see it will have the opportunity.

The Little Country Theater players presented "The Vestal Virgins" on the afternoon and evening of the first day of March, that particular day when the sacred flame of the temple of the Vestal virgins was extinguished and relighted in the old Roman period. It has been the intention of the author of this one-act play and in each of her dramatic productions written thus far, to emphasize the thought of beauty thru word, action, dress and all stage appurtenances. She feels keenly that the tendency of the vaudeville, the moving picture, and the many American melodramas, is to present too frequently the ludicrous, the repulsive, the sanguinary; that the young people of the twentieth century should have more opportunities to experience that sense of exaltation which comes from witnessing the beautiful in artistic drama. The audience felt keenly the symbolism of the old Roman religious festival. "The Vestal Virgins" depicts a scene in the temple of Vesta revealing the accusation of Tuccia, one of the vestal madens, of unchastity. She is proved innocent thru the influence of the goddess Vesta whose unseen act is made realistic by Tuccia's power to carry the water in a sieve from the Tiber to the temple without spilling a drop thru its many perforations. Tuccia, after passing down the aisle of uplifted torches, rendering her song of triumph, dedicates herself to light, "that light which permeates the universe and giveth unto all human beings the 'Breath of Life.'" The virgins then find themselves together as followers of light thru the "Flame Dance," composed by Marie Kammeyer, which closes this one-act drama. The play was enacted again at the Orpheum theater in Fargo, as part of a program for the benefit of the Red Cross movement.

The Little Country Theater is attempting to be of benefit not only to the students of the agricultural college, but also to the community of which this theater is a part; and that field is the entire state of North Dakota.

CAMPUS AND ALUMNI

The winter term will close on March 22, and the spring term will open on the following Monday, March 26. Teachers whose schools close at about this time will find the spring term a very favorable time to do some work at the agricultural college in agriculture, manual training and the advanced courses in education. In agriculture, courses will be available in field crops, breeds of live stock and stockjudging. The department of education will offer courses in the principles of teaching, vocational education, school law, current educational literature, and agricultural courses in high schools, and the manual training department will be in a position to offer individual instruction in many lines of woodwork, drawing, artcraft, etc.

The office of the registrar is mailing postcards to members of the several alumni organizations, seeking from each one the latest information regarding his whereabouts and recent activities. It is hoped that a lot of news will in this way be gathered that will prove of interest to the readers of College and State.

The faculty has recently approved a plan whereby it is hoped that the different legitimate lines of student activities will be shared by larger numbers of the student body and thus the loads of the few willing burden bearers of the past be considerably relieved. It is felt that this responsibility has not been sufficiently well distributed and that a few of the more efficient students have been undertaking too much. The plan will be made effective with the opening of the spring term and its inauguration is being awaited with a good deal of interest by members of the faculty as well as by students, who hope that it will prove a large factor in the improvement of scholastic standards.

L. P. Nemzek writes from Gibbsboro, N. J.: "This will acknowledge receipt of the first issue of College and State the reading of which afforded me much pleasure, I am heartily in sympathy with the purpose of this publication."

The North Dakota Agricultural College alumni association will publish the Spectrum during April or May. The edition will be called The Alumni Publication and will consist of sixteeen pages.

COLLEGE AND STATE

A Publication of the North Dakota Agricultural College, Fargo.

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More Education

The quickened interest in education now manifested in England may be interpreted as a prophecy of greater interest in education everywhere when the war ends. Technical education is seen to be imperative, and vocational training will receive great impetus. Another conclusion, quite as impressive, is that education which does not establish ideals consistent with real civilization is dangerously incomplete.

Thoughtful Patriotism

The utterances of the president have given a thoughtful turn to patriotism. The world is to be made safe for democracy. The formulation of the aims of war in terms of democracy and permanent peace marks an epoch. The loyalty and service of thoughtful men and women cannot be complete without their earnest consideration of purpose in the present conflict. Not only is this a war against belief in war, a war for permanent peace, but it is a war which should result in definition of democracy and ardor for newer ideals of human justice. Political achievement should not be allowed to remain so far in the rear of scientific development.

Agricultural Extension and the Nation

The national emergency has resulted in discontinuing, so far as possible, planned lines of routine work in the agricultural extension department of the college. Every individual in the department is giving practically his entire time to work related to present or future food production and the elimination of waste.

The county agents are emphasizing the production of a good wheat crop, with diversification and the utilization of waste land and increase in the number of live stock. Attention is given to individual needs regarding finance and seed.

The home economics workers are campaigning for the cold pack method of canning vegetables, the curing and canning of meats and the elimination of food waste. The organization of garden clubs in towns, villages and country is going forward. In Williams County the county agent is arranging for 30 special canning and food preserving demonstrations in different places during the coming summer and early fall. Women and girls in villages are being invited to take hold of a special poultry project.

Potato clubs, acre-yield clubs, pig clubs, garden and canning clubs and poultry clubs are being organized with the boys and girls. This club work of the boys and girls will increase production of home foods. The home economics section will cooperate with the clubs for canning.

Two hundred sixty papers of the state are receiving the agricultural information service conducted by the agricultural editor. Appeal is being made for an increased food production.

Plans are being prepared for the mobilization of farm labor and its distribution thru the efforts of county agents or district representatives.

New Catalog Shows Changes in College Organization

Quarterly Record, Volume 8, No. 1, the general catalog of the college, is now in the hands of the binders and should soon be ready for distribution. In many ways this catalog will show a greater development of the organization of the school than any previous issue, and will prove of more than usual interest to alumni and friends of the institution.

As far as information and instructions were available up to the time that the copy was sent to the printers, the recommendations of the educational survey commission, as embodied in its report and as interpreted by Dr. Craighead, commissioner of education, have all been made effective. The catalog, then, shows the six newly organized schools, viz: the school of agriculture, the school of chemistry and pharmacy, the school of education, the school of home economics, the school of mechanic arts, and the school of veterinary medicine and surgery. In addition to these regularly organized schools, there is the "group of applied sciences" and in this group are included the curricula in general science and biology.

A number of important changes in curricula are announced. None of the curricula that have been offered in recent years have been eliminated nor in any vital way altered. The engineering curricula are all retained, altho it is understood that the North Dakota Agricultural College in its engineering work will place the emphasis upon the application of engineering to agricultural and rural problems.

On the other hand, the school of education announces a number of new curricula, especially two-year college curricula for high school graduates. Graduates from the two-year curricula will be entitled to second-grade professional certificates, and will be qualified especially for positions in consolidated schools and for teaching vocational branches. The four-year curricula for high school graduates are for teachers of agriculture, teachers of mechanic arts, teachers of science, and for vocational and rural school administration. Provision is made in these curricula for minor lines of training so that prospective teachers may combine other lines of work with the major line of specialization. Graduates from the four-year curricula are granted credentials by the state board of education that lead directly to life certificates to teach in the public schools of North Dakota.

Alumni and others may have a copy of the catalog sent to them by writing the Office of the Registrar, Agricultural College, North Dakota.

Federal Aid for Vocational Education

Under the recently passed Smith-Hughes act, the federal government provides substantial aid for vocational education. Instruction shall be of less than college grade and designed for persons over fourteen years of age. Federal aid for vocational education of more advanced character has been provided for in a series of acts beginning with the Morrill Act of 1862. The new legislation connects the federal government directly with vocational instruction of secondary school grade.

There are two prominent features in this legislation. Provision is made for cooperation with the states in preparing teachers. Teachers, supervisors and directors of agricultural subjects and teachers of trade and industrial and home economics subjects are specified in the section providing for aid for training teachers. These teachers must have adequate vocational experience or contact in the line of work for which they are preparing themselves, or they must acquire such experience.

A second feature is the appropriation of funds for cooperating with the states in paying the salaries of teachers, supervisors or directors of agricultural subjects, and the salaries of teachers of trade, home economics and industrial subjects. No aid is given for paying the salaries of supervisors and directors of trade, home economics and industrial subjects, simply for teachers of these subjects.

The subsidy increases annually until it reaches the sum of seven million dollars. The maximum sum for the payment of salaries is reached in 1926, for the training of teachers, in 1921.

A federal board for vocational education is created. This consists of the secretaries of agriculture, commerce, and labor, the commissioner of education, and three citizens appointed by the president. One of the appointive members is to represent manufacturing and commercial interests; one is to represent agriculture, and one labor.

The federal board acts in conjunction with a state board designated by the state for the functions described in the act. Such state board may be an existing board or one especially created for the purpose.

The instruction upon which the federal appropriation applies is restricted to the subjects specified. The cost of instruction supplementary to that in agriculture and in trade, home economics, and industrial subjects, necessary to build a well-rounded course of training, is to be borne by the state and local community.

This legislation was pending in congress for several years and in its final form was supported by educators and commercial bodies. The American Federation of Labor also approved the measure but insisted upon unit control of vocational and other education. The act leaves this question to the individual state. Present sentiment is strongly in favor of unit control and it is unlikely that more than a few states will experiment with the dual idea.

Action by state legislatures is required to accept the benefits of federal law. The states are also required to expend an equal amount for salaries. In the recent legislative assembly of North Dakota a bill was introduced to secure the benefits of the federal appropriation. This bill failed of passage. Accordingly nothing can be done in North Dakota under the Smith-Hughes act until after the meeting of another legislative assembly.

The fund provided by the federal government is large enough to afford a marked stimulus to vocational education. Under the law North Dakota would receive a maximum allotment of $51,200, by the year 1926. Add to this as much more, to be appropriated by the state, and a fund of over $100,000 would be ultimately available for vocational courses and the training of vocational teachers.

The vocational schools provided for include the following: all day vocational schools for persons fourteen years of age and over; part-time vocational schools and classes to provide supplementary and related instruction during a portion of the working time of persons in employment; evening schools or classes in industry, commerce and agriculture to provide supplementary and related instruction for persons of sixteen years of age and over, already engaged in profitable employment, and evening schools or classes in homemaking to provide instruction in the non-wage earning occupations of the household, for girls and women sixteen years old or over.

COMMUNITY SCHOOL BUILDING
"THE WHEATON IDEA"

The Community Center Movement

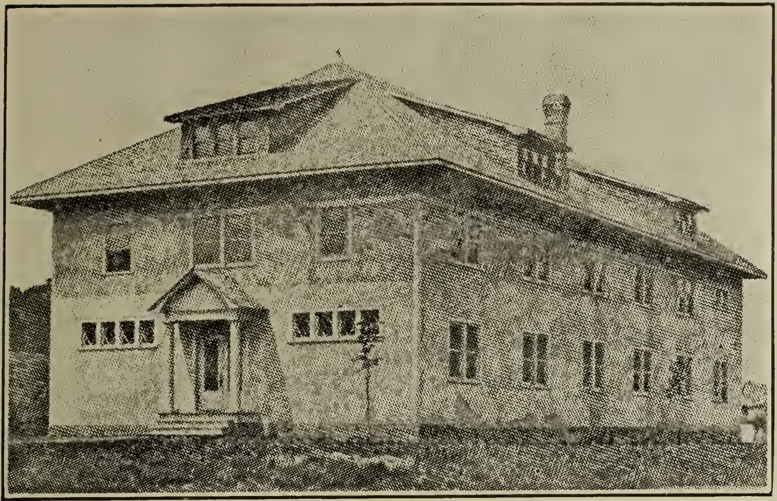
Alfred G. Arvold

The cradle of America democracy was the old New England town meeting. With the possible exception of the county court day in Virginia and Kentucky, which still thrives, it was the first expression of the community center idea in the United States. The New England town meeting, however, had more of the neighborhood spirit in it than the county court day. Both resembled each other in one respect. They were more or less rural in their make up.

A community center is a place, a neighborhood laboratory, so to speak, where people meet in their own way to analyze whatever interests they have in common and participate in such forms of recreation as are healthful and enjoyable. The fundamental principle back of the community center is the democratization of all art so the common people can appreciate it,—science so they can use it, government so they can take a part in it and recreation so they can enjoy it. In other words, its highest aim is to make the common interests the great interests. To give a human expression in every locality to the significant meaning of these terms—"come let's reason and play together"—is in reality the ultimate object of the community center.

In some respects it makes little difference where a community center meeting is held. It may be in the sitting room of a farm home, the basement or parlor of a church, a village or town hall, or a consolidated school. In a city the community center is usually located in a school house of a certain neighborhood, or a division of a municipality called a ward. In a rural district it is different. Willett M. Hays says persons in the country think of the community as that territory, with its people, which lies within the team haul of a given center. At this center a church, a schoolhouse or a village hall over a country store is located. Here the country people hold their meetings. In short, the team haul radius must naturally be taken into consideration in the development of a rural community center.

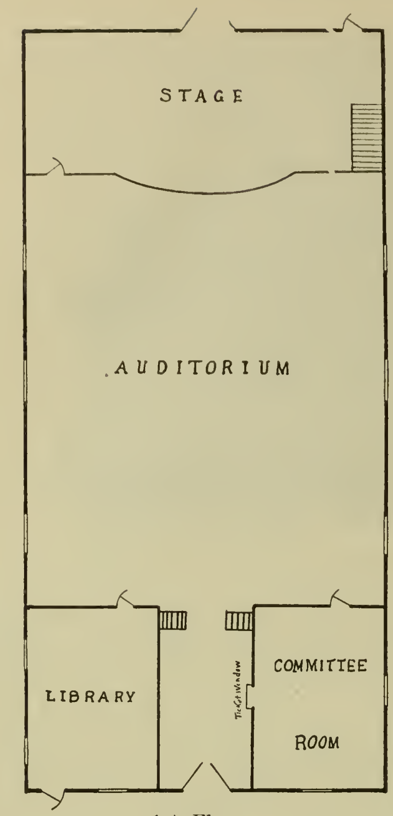
The growth of the community center movement in recent years, to say the least, has been extraordinary. It has already assumed unusual national proportions. Cities, towns and rural communities everywhere seem to have caught the spirit. Social settlements in our larger cities and consolidated schools in our country districts have doubtless blazed the way. The story of Jane Addams at Hull House will, indeed, make a remarkable chapter when the social history of America and Europe is written. Marie Turner Harvey and her "Missouri One Room School," near Kirksville, will al-



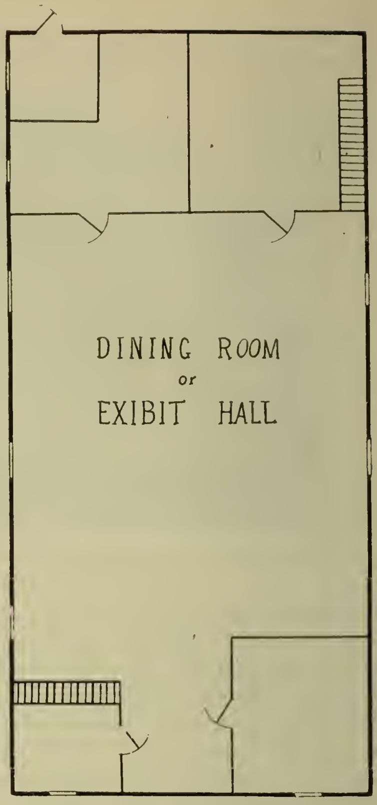
Community Building—Spring Valley, Wisconsin, Courtesy Agricultural College Extension Division, University of Wisconsin

ways be remembered. Columbia, Northwestern and Chicago Universities still maintain social settlements. Thru the efforts of Edward J. Ward two social center conferences were held at Wisconsin and Kansas universities. During the fall of 1915 John Collier, president of the national community center conference of America, founded the New York training school for community workers. The United States bureau of education now has a division of work, supported by government funds, devoted exclusively to the development of social centers in schoolhouses. The county agent movement in conjunction with the ten thousand agricultural cooperative societies in the United States have aided materially in the development of community centers in rural districts. In the last sixteen years the Jewish Agricultural Society has placed 3500 families on farms in thirty-five states and encouraged the organization of community centers. In requiring a certain group of farmers to band themselves together in order to secure a farm loan, the federal farm loan board, in carrying out the intent of the law, is encouraging the spirit of cooperation, which eventually means a more wholesome rural community growth. The Massachusetts Agricultural College under the leadership of Kenyon L. Butterfield has done much to give the country church of New England a new social vision and make it a center of neighborhood activity. Down at Plainfield, Illinois, a man by the name of McNutt rejuvenated the Du Page country church and made it a genuine rural community center. Numerous other instances might be cited to show the national growth of the idea.

The life of the country people of the northwest will inevitably find itself in the community center. Here the Norse, the Slav, the Teuton, the Saxon and the Celt have settled that they may find a freedom of expression in art, in science, in education, in government and in recreation. With them they have brought many splendid customs and attributes of character well worth preservation. The Norse has tasted the spirit of the community center in the *Lag;* the Slav in the *Mir* and the *Artel;* the Teuton in the *Gemeindschaft;* the Saxon and the Celt in the Fair and the Feis. Ibsen and Bjornson, Tolstoy and Tchekoff, Kant and Schiller, Shakespeare and Gladstone, Synge and Plunkett set examples in community expression worthy of emulation.



1st Floor
Community Building—*suggestive plan for first floor*



2nd FLOOR OR BASEMENT
Community Building—*suggestive plan for second floor or basement*

Figuratively speaking, the backbone of the northwest is composed of five agricultural commonwealths—Wisconsin, Minnesota, South Dakota, Montana and North Dakota. All these states have, so far as their rural districts are concerned, caught the community center spirit. In Wisconsin the Skillet Creek farmers' club has made the locality noted for its homes, its gardens, its orchards, its schools and its highways. At Spring Valley in the same state they have erected a splendid community hall, which is used continually. A little over a year ago the citizens of Wheaton, Minnesota, dedicated a thirty thousand dollar community building built by public taxation. It is one of the finest structures of its kind in the United States and has already demonstrated its usefulness. Last October seventy people, townsfolk and farmers, erected and dedicated Hendrum Hall at Hendrum, Minnesota. It cost seven thousand dollars and was built on a cooperative plan. The Oak Mound consolidated school and church in the same state are both energetic rural community centers. Under the leadership of a county agent by the name of Wije fifteen hundred farmers of Kingsbury County, South Dakota, belong to some twenty farmers' clubs. Just recently, in the same county, two hundred and twenty farmers met at a farmer's home which is used as the rural community center. Similar instances might be cited in regard to the splendid work which is being done along the same line by county agents in both Montana and North Dakota.

No state in the union affords a greater opportunity for the development of the rural community center than North Dakota. Seventy-two percent of the people live in unincorporated territory. There are at least one hundred and fifty towns with a population of less than five hundred inhabitants. Seven out of every eight people are classed as rural. According to the 1910 census report seventy-two percent of the people are either foreign born or of foreign descent. Only twenty-eight percent are Americans. There are over twenty-five different nationalities represented in the state. The Noltimier consolidated school in Barnes County, the Standing Rock young peoples' society at Fort Ransom, the McKinley township farmers' club near Kensal, North Dakota, are typical examples of genuine rural community centers. None of them are located near a railroad. All of them are extremely active in community work.

The organization of a community center presents many interesting problems. A skilled physician, when he visits a sick room, always diagnoses the case of the patient before he administers a remedy. In order to thoroly comprehend the social significance of a community one must naturally know something about the community itself. What about the roads leading to the community center? Are they good, or bad? The people—are they American or of foreign descent? Are they conservative and narrow, or progressive and broad? What about the buildings—the schoolhouse, the church and the village hall? Are they suitable for large or small gatherings? What do the people do for recreation? One can readily see why a knowledge of the roads, the people, the buildings and the activities is essential in the organization of a community center.

The field of work of a community center is broad and comprehensive. Its activities are classified according to their nature—civic, educational and recreational. An open forum, or a public discussion upon such civic questions as good roads, schoolhouse architecture, drainage, taxation, landscape gardening always arouses interest. The commemoration of different national holidays is another civic enterprise of a community center. In the promotion of school fairs, exhibits of plant life and folk craft work, demonstrations, farmers' institutes, conventions, music festivals, lecture courses, parent-teachers' associations, farmers' clubs, illustrated lectures, motion pictures, home talent plays, pageants and festivals, the community center finds an opportunity for educational work. Closely associated with the educational activities is the problem of recreation. Athletic games of all kinds with everybody participating in them, folk dance festivals, and school playgrounds give people of a community a chance to express the play side of their nature. The activities of a community center are many and varied.

The rapid growth of the community center idea in America has practically revolutionized schoolhouse architecture. Unused halls and portions of school buildings and churches are now being remodeled into places suitable for community center work. The physical aspects of the problem are worthy of careful consideration. People when they become neighborly demand a meeting place that is central. They want a community building suitable for the activities they wish to carry on. The schoolhouse usually offers these advantages. With a little additional expenditure of money the schoolhouse whether old or new can be made an ideal community center. In a country community the consolidated school house, surrounded by fifteen or twenty acres of land which can be used for demonstration plots, picnic grounds, an athletic field and auto or horse sheds is a model rural community center. This ideal arrangement for a rural center has often been called ''a miniature county fair.'' The accompanying illustrations are simply indicative of what has been done in the construction of buildings suitable for community purposes.

The success of any community center depends upon group activity—people working together. The success of the future of the movement is guaranteed. Never in the history of the world have people thought so much about the neighborhood idea. It's on the lips and in the hearts of many. Out of this neighborhood laboratory called the community center will come a new life—the life of the common people. In this laboratory, the differences of the races will be adjusted. It is in the participation in the activities of the community center that the people will find themselves.

CAMPUS AND ALUMNI

Miss Aldyth Ward, '02, has been appointed by Governor Frazier as a member of the public welfare commission that was established by the recent session of the legislature to carry on an "Investigation in Regard to the Economic, Moral and Social Conditions of Women and Child Workers; Prescribing Duties of Hotel Inspectors in Relation Thereto, etc., etc.," Miss Ward's appointment came to her as a result of the knowledge and experience gained from her work for "Votes for Women."

Chester Holkesvig, '11, has moved to Montreal, Canada, to take charge of the dry color plant of the McArthur, Irwin Co., Limited, which is under contract to manufacture in Canada the Lucas dry colors. The Race Street Courier, the house organ of the John Lucas Paint Co., has this to say of the change: "This move represents a well merited promotion of Mr. Holkesvig and we have every confidence that he is going to acquit himself creditably in his new responsibilities and make an important place for himself in the future."

Registrar A. H. Parrott attended the eighth annual meeting of the American Association of Collegiate Registrars, held at Lexington, Kentucky, April 25th to 27th. At this meeting a good deal of time was given to the problems of registration and credit that have arisen out of the war conditions, and the association endorsed as patriotic and expedient the principle of allowing scholastic credit to students who cease their college work for service in military or allied activities and favored acceptance into college next fall, or later, of new students whose entrance credits may be somewhat short because of similar curtailment of their secondary school courses this spring.

A number of matters pertaining to registrars' duties and work were given earnest consideration, and a matter of special interest to the North Dakota Agricultural College was the placing upon the records the early history of the association's organization. Mr. Parrott was given sole credit for the idea and, as an appreciation of his activity in the matter was elected honorary president for life.

There are now over one hundred institutions represented in this membership and sixty-five registrars were in attendance at the meeting.

Before an audience at the college, Hamilton Holt, editor of The Independent, named four great issues: the question of the distribution of wealth, an issue between classes; the woman question, which has reference to the position of woman in the modern political, industrial and social system; the race question, pertaining to the relation of races within communities and nations, and lastly the problem of internationalism and permanent peace. Mr. Holt is a leader in the organization of the League to Enforce Peace.

COLLEGE AND STATE

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Arland D. Weeks........................Editor
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A. H. Parrott.........Business Manager

A Program For High Schools

The ideal of a high school education for all is better established in the northwest than in any other part of the United States, and, it follows, the world. North Dakota is a state in which high school development is going forward at a good pace, and it is the prevailing view that high school training should be available for all. It is as common to-day for parents to aspire to high school graduation for their children as, forty years ago, it was to hope for a common school education. High schools are accordingly being multiplied thruout the state, and many of the consolidated schools are growing into high schools.

With public opinion extremely favorable to high schools, with their accessibility assured, and with a tendency toward far larger enrollment, there appears, as the main problem in secondary education to-day, the selection of things to be taught. Problems of method and of organization are less urgent than the problem of the wisest possible choice of subject matter for courses of study in high schools. Anyone who thinks that this question is as yet even fairly well disposed of "has another guess coming." The curricula are still too cluttered with materials of unsubstantial values, while various important branches and divisions of knowledge are yet largely unknown in high school courses. High school students, like everybody else, need to possess the knowledge that makes a difference with them. In working out this problem of knowledge values the agricultural college may hope to render valuable service.

The Modern Consolidated School

Charles G. Carlson, '15,
Prin. Noltimier Consolidated School,
Valley City, North Dakota.

North Dakota has now over 400 consolidated schools—a splendid showing for a state whose population is considerably less than a million. California, with all its riches and with a population three times as great as ours, has but twenty-eight consolidated schools. During the past few years consolidation has come like an avalanche. This conclusion then naturally follows—the consolidated movement must be past the experimental stage and must meet with public approval. At first the movement was slow. In our district where consolidation has just been established, the first petition was circulated twenty years ago. It takes about that long in many cases to get a good thing. The pure food law, you know, was seventeen years in coming. The movement has come to stay, however, and we can look forward to the day when most of the townships of our state will have consolidation of country schools.

Using the term "modern" presupposes an antiquated system. A few years ago it was thought splendid if 18 sections formed a unit. Thirty-six sections, it was thought, was too big. The little two room schools with eighteen sections to draw on are today a thing of the past except in a few instances. Even the township unit of today (the modern idea) may give place to the four township unit in a few years. Just a suggestion, but why not?

In considering modern consolidation, the location of the school is a very important feature. Considerably more than one-half of the schools of this class now are located in the little towns. We believe that the logical place for a consolidated school is not in the town but out in the open country. There are several reasons for this statement. In the first place these schools are the means by which the different rural problems are going to be solved and we can state as a matter of fact that the town consolidated schools do not seem to be doing much of the solving. It is true that a school of this kind located in a town does bring the country folks and the town folks closer together. That is always worth while but there is more to it than that. To solve country problems you have "to think country" and you think country in the country, not in the towns. Again, we believe that the one big object of a consolidated school is to prepare boys and girls for intelligent, agricultural citizenship. If that is true, this is best accomplished out in the open country instead of within a stone's throw of box cars, pool halls and stores. Also, it is well to have the eyes of the children in the consolidated schools

BASKET BALL TEAM, NOLTIMIER CONSOLIDATED SCHOOL country-ward, and this is best brought about in the open country, for the "eyes of the little town" are cityward. We believe, therefore, that greater good will result, as far as country people are concerned, from the country-located schools.

In considering modern consolidation, the question of expense is an item—no it's a club,—that is often used to "knock" the project. The matter of cost has been gone over so many times that we hardly feel warranted in touching on it. A few words, however, may not be out of place. Candidly, it does cost more—at first. The question, however, is not so much what you pay for a thing as what you get for your money. The modern consolidation of a township will cost now approximately $15,000. This seems like a lot of money for a country community to spend for a school, yet in no instance has a community even desired to return to the old after trying the new. The initial cost in large but the returns, or "what you get for your money," more than warrants the expenditure. After the school is paid for the actual cost is but little more than for four one-room schools. For instance, a certain modern consolidated school in the eastern part of the state paid off the last installment on the building last year. The tax this year is 12 mills. Not far from this consolidated township is a district with three one-room schools. The levy is 13.7 mills. This is not an isolated example. In the same county are a dozen or more districts where the difference in cost between the old and the new is not great. A $3500 levy will pay the expenses of a modern school for nine months and this includes a high school department.

What home is without a mother, that a consolidated school is without a teacherage. To be successful in the highest sense of the word, a modern open-country school must have its teacherage. It is out of the question for teachers to "board 'round." The work of any school is exacting; too exacting for teachers in consolidated schools to go long distances. In this connection it must be remembered that it is not only the school work that a teacher has on his hands; the social center work demands much time, thought and effort.

A teacherage is necessary for an open country school; so is a piece of land. Too many of the schools have only from five to ten acres. Considerable of course can be done with ten acres if it is properly laid out but twice ten acres is better. One of the schools of Barnes County has set the example for the other schools of the state by buying forty acres. This acreage is divided this year as follows: 25 acres in flax (later to be put into demonstration plots and alfalfa), two acres in trees, two acres in gardens, five acres in a township park and six acres in school and play grounds. No other school in the state has attempted quite as big a program as this. The demonstration plots and gardens of the consolidated schools will take on more importance as the years go by. In fact we look forward to the time when these schools will be township experimental stations. To bring this about there must be closer relations between the schools of this type and the experimental station at Fargo. While the better farming movement has done great good in our state, we believe that another better farming movement centered around the consolidated school, supported in part by experimental station funds, will do infinitely more good. Such a better farming movement would reach the children and that is where to begin in the making of good farmers. Again such a system of demonstrating better farming would reach every farmer in the township. He could not help being interested for his money would be going into the project. Furthermore the plan would be intensely practical.

"By their fruits ye shall know them" applies to consolidated schools as well as to other fields of human endeavor. And the fruits are evident enough. First, of course, by the fine boys and girls that all the consolidated schools are turning out—strong mentally, physically and morally. Compare the eighth graders of the new school with those of the old and see the difference. It is in part the opportunities for association that help in this development. This new rural manhood that the consolidated school is developing we believe to be the biggest of all its accomplishments.

To illustrate what consolidation can do, we are going to point out some Barnes County "fruits." One of the big things attempted by the consolidated schools there was a county rural lyceum course. It was started last fall and some of the big consolidated schools took up the course. Even some of the small one room schools fell in line and took one number. The course consisted of six splendid numbers and it was a financial success in every school. The tickets were sold as low as $1.00 in one consolidated school (with free admission to students) and $72 was cleared on the course. It was planned to give the course at cost, yet in this case, after the second number was given, the course became a money maker. The rural lyceum for next winter is going to become even better and it will be extended into all parts of the county. These lyceum courses help wonderfully in making country life worth while, for they bring people together and so get them out of their isolation.

The consolidated schools of the county mentioned have also a good, live debating league. Ten or twelve schools participated last winter and much good resulted. In the development of rural leadership there is nothing better than debate. Teach country boys or girls to get up and talk intelligently to an audience and many of the rural problems will be solved in short order.

Consolidation gives opportunity for athletics and it is wonderful to see with what enthusiasm the boys and girls go into the different sports. Few country children know how to play, yet in these larger modern institutions the play instinct is soon developed.

These things mentioned,—lyceum courses, debating and athletic associations,—are some of the big things that consolidation makes possible, but that is not all. The children have opportunities in manual training, domestic science and agriculture that can never be secured under the old system. Relative to agriculture, a word here may not be out of place. This is an important subject but it is not so important that it should be held forth first, last and all the time as some recent authorities seem to think. Much attention ought to be given agriculture, but with this in mind—the development of agricultural citizenship; not agriculture alone. Besides all this the children in our consolidated schools have the advantage of school savings banks, hot lunches at noon during the winter, community singing and musical instruction, medical inspection and dramatics. Is there any investment you can think of that will give bigger returns within a short time than consolidation?

And now in conclusion, the part which our Agricultural College must play in the consolidated movement. The school and community leaders of the future must come from the A. C. for it is only there that the "atmosphere" for rural leadership development is right. The other institutions of the state cannot do this work nor is it within their province. Right now there is a strong demand for A. C. men in the consolidated work—a demand far bigger than the supply. The consolidated movement will appeal to men of big caliber in the future and just as agriculturally trained men of big caliber and broad views get into the work, in that proportion will the movement increase in importance and service, for we know that no stream can rise higher than its source.

The Relation of Temperature to the Growth of Corn in North Dakota

Abstract of paper presented by R. C. Doneghue before the North Dakota Academy of Science at Grand Forks, May 4, 1917

Corn has an important place in the cropping system of the North Dakota farm and a more complete knowledge of the conditions influencing its growth is desirable in handling and improving the crop. It thrives best in a warm climate but certain varieties and strains have been developed that are able to produce good crops in cooler climates than others. In North Dakota the temperature during the growing season is an important limiting factor because of the relatively short period between frosts. In mapping out the regions of the state that are suited to the several strains and varieties it is necessary to know something of the number of heat units available for the growth of corn. The period between the last killing frost in the spring and the first in the fall has been used as a measure of the relative length of the growing season for corn in different localities. This does not take account of the difference in the daily temperature at the various points. In view of the fact that corn grows faster in a warm day than a cool day it is evident that this is an imporant consideration. A method has been devised by Dr. B. E. Livingston of John Hopkins University which takes this factor into consideration. He has worked out a system by means of which the heat units available for the growth of corn can be calculated from the mean daily temperature during the frost-free period. This system is based on the observed rate of growth of corn seedlings for 12 hour periods.

Applying this system to North Dakota we find a great variation in the available heat units for the growth of corn. The weather bureau stations at Ft. Yates, Forman, Bismarck and Wahpeton showed over 4500 heat units during a normal season when this system was used, and Hannah, Langdon, McKinney, Lakota, Crosby, Bottineau, Cando, Portal and Willow City less than 3000 heat units. Other stations in the state are intermediate between those. When a map is made showing the heat unit zones it is found that there are warm regions along the Missouri River and in the Red River Valley. Such a map for the season of 1916 shows considerable variation from the normal in various parts of the state. The highest number of heat units was at Forman, the number being nearly 6500. At Fargo there was approximately 5800 and at Fullerton 5500. The lowest was at Bowbells being approximately 3300. Hansboro, Howard and Lakota were also quite low.

Such a system of calculation will not show exactly where each type of corn can be grown because other factors such as the fertility of the soil, rainfall, etc., influence the growth of corn, but it will be of material assistance in interpreting the results secured with this crop in the state. The maps referred to show that there is great variation in the number of heat units in localities of the same latitude. They will be of material assistance in selecting and developing varieties for various localities in the state.

Library Methods

Harriet Pearson,
Assistant Librarian

In the fall of 1913 a new course was introduced in the North Dakota Agricultural College for the benefit of freshmen. At first the instructor met the students once a week for eight weeks, giving a series of lectures which led to the working out of problems in the library. As no credit was given for the work and as so short a time was allowed, not as much was accomplished as the instructor had hoped.

After two years the faculty decided that credit should be given for the course and that the lectures should continue for the entire term. This year, as last, nearly sixty students satisfactorily completed the course.

The effect in the library has been marked. Not only are more college students able to help themselves, but the tendency of high school and short course students also to be independent has been noticeable.

Altho the purpose of a library is to serve, by helping the student to help himself he is made much stronger for the future. In addition, knowing how to use a library enables one to save time, to come in touch with more books and to be at home among them.

The course in outline is as follows:

Lecture No. 1—The requirements of a good book, the exterior and interior parts of a book, the purpose of a library, the aim of the modern library movement.

Lecture No. 2—The classification and arrangement of books, the Dewey decimal system, the arrangement of books in this particular library.

Lecture No. 3—Pt. 1, The card catalog, its advantages and disadvantages, various kinds of cards, the information on each card. Pt. 2, Magazine indexes. Names of various kinds, form of entry, method of finding magazines on this campus.

Lecture No. 4—Encyclopedia. What constitutes a good encyclopedia. Names of the best English and American encyclopedias. Strong points of each.

Lecture 5—Dictionaries. The requirements of a good dictionary, contrasting features of the best dictionaries in the English language. The special dictionaries as the dictionaries of slang, rhymes, synonyms, Americanisms, etc.

Special Subjects

Lecture No. 6—Biography. Mention of some of the best dictionaries of biography which furnish more complete articles than encyclopedias or magazines. General works, national, special and contemporary biography.

Lecture No. 7—Pt. 1, History. General reference books, dictionary of dates, antiquities, local history. Pt. 2, Geography, including gazetteers, atlases and descriptive works.

Lecture No. 8—Literature, including general literature, criticisms, oratory, quotations, allusions, anthology, short stories, etc.

Lecture No. 9—Agriculture and Home Economics. The method of using the publications of the U. S. department of agriculture, and the various experiment stations, including bulletins, circulars, and reports. The various tools as the agriculture catalog, the experiment station record, the agriculture indexes and year books.

Lecture No. 10—Public documents, sociology, education and mention of some of the leading reference books of various subjects that hold a minor place in this institution.

As it is the aim in most of the lectures to include only the reference books in our own library, practical probems can be solved after each subject is considered.

Toward the close of the term, each student is given one problem at the public library and one at the Masonic Temple with the expectation that after he leaves this school he will soon learn to feel at home in any library that he may enter, provided he goes to do careful, conscientious work.

The review problem does not confine the student to one subject as in the case of the other problems, but each one is given the privilege of finding the answers in any book in the library and in as many places as possible.

Although it is not expected that in so short a time any one student will be a finished librarian or even will be able to keep in mind many distinct authors and titles, however, at the end of the course each one should be able to judge a good book, should have a keener realization of a systematic arrangement in a library, should be able to feel his way about step by step without so much waste of time in needless search, and more than that he should be able to feel the influence of the best things that have been thought and written.

As the course develops, the instructor hopes to be able to introduce more tools and suggestions that will be especially helpful to students in an agricultural college. Thus far, few texts have been written on the subject of library science and these few do not apply to so short a course, so it seems advisable to use the lecture method. Next year the making of a bibliography may be considered in addition to the other lectures, so that each student will have a thoro knowledge of how to investigate a subject.

"Social Forces in American History"

This is the title of an interesting book by A. M. Simons, (published by The Macmillan Company, New York). In this work the author has aimed to bring out "underlying social forces" rather than to pay a great deal of attention to individuals. In the process of describing social forces, however, there are numerous characterizations of prominent men which challenge attention. It will be shocking to many minds to find, for example, John Hancock called the "prince of smugglers," getting up a mob since dignified as "The Boston Tea Party," in order to save the gains in his own illicit traffic; Washington referred to as a royal surveyor who used his public position to speculate in land; and John Marshall described as having been placed at the head of the supreme court in order to carry to "the uttermost limits" the usurpations of popular power by that court.

In tracing to economic interests many of the actions of American leaders and the principles of American parties Mr. Simons' point of view is in harmony with that which is being increasingly recognized by historians. Mere glorification of our past life gives wrong and even dangerous impressions. Patriots who have been descried dimly thru roseate clouds of semi-legends have been found to be human beings influenced by their own interests and the interests of their class and the circumstances of the times, who debated and sweated and sometimes plotted and swore. We are beginning to be able to trace the great movements which to a large extent have carried men along, and we are encouraged to think that the country is getting better in its poiltical and social life, rather than worse. Mr. Simons' book on the whole, I think, enables us to see constructive forces at work.

Yet the book shows the one-sidedness of the social reformer rather than the broadminded comprehension of the past which must characterize the true historian. In the eagerness and joy of getting new glimpses of the careers of influential men in American history and of bringing out keenly and suggestively new aspects of our national development, men of the reforming type who write history are prone to forget the great psychological fact that men act from mixed motives and that it is very easy to exaggerate the influence of one set of motives.

When all has been said, however, the book is one well worth reading. It helps to overcome the narrow views of the older text-books. It brings out valuable and true aspects of American history, which are entirely new to many of us. It is stimulating and makes one think. Lastly, it is written in a clear, vigorous style which holds the interest from the first page to the last.

William J. Trimble,

Department of History and Social Science, North Dakota Agricultural College.

CAMPUS AND ALUMNI

Commencement

The attendance at the June commencement was not as large as it has sometimes been but this does not signify that the occasion lacked at all in the pleasure and inspiration that have marked former meetings. Those who did attend had a most enjoyable time and have promised to return next year with at least one additional alumnus in tow.

The annual meeting was held in the parlors of Ceres Hall and was made important thru the decision to employ a salaried secretary-treasurer. Some discussion developed as to the best method of paying such an officer and in the end it was decided to grant him twenty-five percent of all yearly dues collected except those paid on life memberships. It was also decided to invest in Liberty Bonds whatever funds have been accumulated on life memberships.

The work to be done by the secretary-treasurer will depend upon the man elected to the office each year. Fortunately, for the coming year, Mr. Walter Baumgartel, '16, has accepted the office. He will be at the college and will no doubt prove an exceptionally good man for the place. He expects to act as alumni reporter for the Weekly Spectrum and for College and State, collect dues, arrange for the Christmas meeting and for the annual meeting and ball, keep the alumni in touch with the college and in general do anything that will make our alumni association a vital organization that shall at all times work actively for the welfare of the institution.

Other officers elected were: Miss Louise Fitzgerald, '16, president; S. K. Bjornson, '17, vice-president and Mrs. Mary Darrow Weible, '04, William Guy, '16, Elmer May, '05, and B. F. Meinecke, '89, as members of the executive committee.

The banquet, held in the dining room of Ceres Hall, followed immediately after the business meeting and was well attended by alumni and members of the faculty. A. M. Christensen, '16, retiring president, acted as toast-master. Responses were given by Miss Eleanor Kindred, '17, L. R. Waldron, '99, B. F. Meinecke, '99, Dean C. B. Waldron and Director Thomas Cooper. Following the banquet was the ball with Dr. Putnam once again acting as chief musician and old grads and members of the faculty mingling to the strains of the good old-fashioned two-step and waltz, meanwhile greeting the newer members of the association and exchanging reminiscences of older days.

Summer Schools

During the month of June two summer schools met on the campus. Beginning June 11 and continuing till July 14, were the sessions of the Cass and Ransom Counties Teachers Training School in charge of Registrar Parrott as conductor. Other members of the faculty for this summer school were Superintendent Sweetland of the Enderlin schools and Miss Ashton and Mrs. Inez C. Anderson of Fargo. The attendance was 94.

The School of Traction Engineering was in sesion from June 12 till July 7th with an attendance of 42. Professor Dolve directed the work of the school and was assisted in the instruction by Professor Erickson and Mr. Chisholm.

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Readers of College and State are invited to contribute to these columns anything which they think might be of general interest. The publication is mailed to North Dakota newspapers and state officials, alumni, school superintendents, teachers and others.

The Beginnings of the Industrial Revolution in American Agriculture, 1839—41

William Trimble

The Industrial Revolution is a name for the great change which, beginning in England about 1763, has since transformed most processes of production from the direct physical exertion of human labor to the vastly efficient application of human brains by the utilization of power through machinery. While in manufacturing England rightly receives the greater credit for the working out of the Industrial Revolution, in agriculture the United States has been pre-eminent. It is difficult, indeed, in thinking over our country's history, to point out any line of achievement more distinctive than in the application of machinery to agriculture.

The forces which were to work out this achievement of our nation began to be apparent about 1839-41. Of course some of them are traceable to earlier developments both in the United States and other countries—particularly in England—and some of them worked out their effects slowly in our history; but, nevertheless, there was about this time such a strengthening of the older forces, together with the appearance of a most powerful new one—the settlement, namely, of our prairies—that the collocation of all at that time may be taken as initiating the industrial revolution in American agriculture. These forces or movements may be specified as follows:—(1) The betterment of transportation and the development of markets; (2) The need for a greater surplus of food products; (3) The settlement of the prairies; (4) Land laws favoring settlers; (5) Activities of the Federal Government in relation to agriculture; (6) The dissemination of intelligence; (7) The application of machinery to agriculture.

The two decades prior to 1840 had witnessed marked development of water transportation and the beginnings of the construction of railroads. The Erie Canal, connecting the Hudson River with Lake Erie, had been completed in 1825, and since then the digging of many laterals had made of it a widespreading system serving central and western New York. The main canal, moreover, furnished a commercial outlet to the Great Lakes with a resulting increase in total tonnage of vessels on the Lakes from 3,500 tons in 1820 to 75,000 in 1840. Other important canals had been built, as for example the one connecting Lake Erie and the Ohio River, and also the great central system of Pennsylvania. Steamboat traffic, moreover, was immense, reaching its greatest dimensions upon the Ohio and the Mississippi. Railroads were as yet a novelty, the first having been started but little more than ten years previously. While the total mileage in 1840 was nearly 3,000 miles, the roads were as yet short and disconnected and were of most importance because of their promise of great things to come. A beginning had also been made in the application of steam to ocean-going vessels; the *Sirius* and the *Great Western* had crossed the ocean in 1838 propelled by steam alone, and the latter had made the trip in the remarkable time of fifteen days.

All this improvement meant betterment of markets. The cities of the Atlantic Coast could now find greater range for sale of manufactured products and at the same time draw raw products from greater distances. Farmers and settlers who hitherto had been on a self-sufficing basis now found that their products would bring a price and, since they wanted many things in exchange, they were incited to produce a surplus of some sort for sale. While farmers everywhere in the interior were spurred to new activity, it was upon those living in the country beyond the Alleghanies that the new forces impinged most forcibly. Wheat was beginning to be sent eastward from the faraway villages of Chicago and Milwaukee. The trade southward down the Mississippi was older, but was at this time reacting to a most powerful stimulus. Machine production of cotton-goods had been making larger and ever larger demands for cotton, and the planters of the South had been moving westward into the rich cotton lands of the lower South. Here they had developed a one-crop agriculture and had come to depend for food upon the farmers farther north. Consequently, from both South and East came the call of expanding markets to the farmers of the West and to the settlers who were beginning to move out upon the prairies.

This call was the more imperative in the closing years of the thirties because of scarcity and high prices of food products. Probably at no period in the history of the United States prior to the present year was there such scarcity of wheat as in the years 1835-40. It seems astonishing now that repeatedly grain had to be imported, the supplies being drawn from England, Holland, Germany, Austria, France, Russia, Italy, Denmark, and Sicily. Prices in New York City kept well over the dollar mark, ranging from $1.10 per bushel to $2.12. Of course harvests varied in the different years. That of 1836 was one of the worst that the United States has ever known, while that of 1839 was good. But in general there was no large and dependable surplus.

The cause of this general lack of a surplus was two-fold. On the one hand demand for farm products was increasing because of the growth of towns and cities and because of the temporary needs of new settlers in the West for seed and feed. On the other agriculture in general—wheat-growing in particular—was still carried on in the cramped ways and by the painful labors of woodland agriculture. The cultivated lands of the farms east of the Alleghanies had been wrested from the forest, and on much of this area the lament of a Pennsylvania ploughman still held good: "Off ye stone on ye stump; off ye stump on ye stone." And conditions were much the same on the other side of the mountains, for settlement so far had been confined largely to the woods. Ohio, Kentucky, Tennessee, southern Michigan and Wisconsin were, with some exceptions, in the forest belts. In the prairie regions settlers clung to the woodland; Southern Indiana and Illinois were settled long before the northern parts, and across the Mississippi, as in Iowa, farmers made their homes along the wooded streams. In the timber, indeed, were to be found shelter, fuel, building material and water. The earlier farmers in these regions had lacked machinery, railroads, and incentive of money crops for the conquest of the prairies. Moreover, they had lacked faith in the prairies, deeming them unhealthful and unproductive in comparison to the sort of lands to which they and their fathers had been accustomed. The conquest of the prairies was a new job for American farmers.

This conquest was now begun, although it was still to be many decades before well-drilling, machinery, barbed-wire, binders, and railroads would allow its completion. But already the woodlands were becoming somewhat fully occupied and new settlers hesitatingly began to turn to the prairies. The ideal situation was to have some woodland and some prairie—a situation often to be found in Illinois or Iowa. Moreover, farmers learned gradually to use prairies by the settlement of "oak openings" and small prairies which were interspersed from Ohio westward through the forests of Michigan and Wisconsin. As they found out how much more fertile this sort of land was than the average soil of the woods and how much easier to break and cultivate by getting the right sort of plows and other machinery, they pushed farther and farther out upon the prairies proper and ushered in the great period of prairie agriculture.

This process was accelerated by changes in the national land laws which made them more favorable to settlers. The policy concerning the disposal of the public lands of the United States in the earlier years of the nation had been to sell them in large tracts to speculators for the purpose of raising revenue, and this policy in the main had been continued, culminating in a frenzy of speculation in 1835-36. There had been, however, for many years a tendency toward a democratization of the land laws so as to favor settlers rather than speculators. The first pre-emption law had been passed in 1801 and since then there had been at least sixteen others. A pre-emption law, we may pause to notice, gave a preference right to a settler to buy a piece of land he had settled on at a minimum price without having the land sold under competitive bidding to the highest bidder. But all pre-emption laws up to 1840 had been retrospective, i. e., they applied only to persons who had already settled on land in specified localities. The great democratic movement of the thirties, however, had as one of its main points of contention the favoring of settlers upon the public domain, and one of the chiefs of that movement, Senator Thomas Hart Benton, of Missouri, had been fighting since 1826 for a general pre-emption law. In the campaign of 1840 the Whig Party made the log cabins an emblem of their devotion to the rights of the common people, and Benton in the session of Congress following that campaign challenged the Whigs by introducing a "Permanent Prospective Pre-emption Law," wherein the building of a log cabin was to be the test of occupancy. The bill failed to pass in that session, but in the special session of 1841 one having substantially the same provisions did pass and was signed by the President, September 4, 1841. It applied to all government land not otherwise provided for and gave to actual settlers upon surveyed lands the exclusive right to purchase a hundred and sixty acres at $1.25 per acre. at the time the land should come into the market. It was the fore-runner of the Homestead Law of 1862, and the policy formulated in these laws greatly stimulated the settlement of the prairie regions.

While Benton and his colleagues were pushing through this important piece of legislation, another movement was being quietly initiated, which has had far-reaching effects upon the agriculture of the United States. The chief factor in this new movement was Henry L. Ellsworth, the Commissioner of Patents. Ellsworth's father was the distinquished Oliver Ellsworth, of Connecticut, who was a member of the Federal Constitutional Convention, chief framer of our first Judiciary Law and second chief justice of the Supreme Court of the United States. The younger Ellsworth, a graduate of Yale, was interested as a young man in agriculture, having acted as secretary of the Hartford Agricultural Society. Later he had come to know well the agricultural capabilities of the West. In his first report as Commissioner of Patents he spoke of "the aid which husbandry might derive from the establishment of a regular system for the selection and distribution of grain and seeds of the choicest variety for agricultural purposes."* It was chiefly on the recommendation of Ellsworth that in 1839 a humble little bill was passed by Congress, entitled "Senate Bill No. 256, to Promote the Progress of the Useful Arts." It carried in all an appropriation of $9,259.22 which included the specification of $1,000, "For the collection of agricultural statistics, and for other agricultural purposes." The thousand dollars was mostly expended on an interesting volume on agriculture in the Patent Office Reports, and this volume, continued annually, was the progenitor of the publications of the United States Department of Agriculture. About the same time plans were being laid for giving special attention to agricultural data in the forthcoming census of 1840. The activities of the Federal Government in the collection and dissemination of information concerning agriculture had definitely begun.

The efforts of Ellsworth, however, and the incipient activities of the Government were outgrowths of a wide movement which may be described as the application of the intelligence of a democracy to farming. It was a fact profoundly significant in the development of democracy that here stood the American farmers on the threshold of the prairies, freed from the incubi of feudalism, shaping land laws in the interests of the democracy of the time, literate, and alert to a throng of new ideas which were being vigorously propagated through many agencies. Chief among these agencies were agricultural societies and the agricultural press.

Agricultural societies had been active in the United States ever since the Revolutionary War. Within two years after the close of the War in the year 1783, the first two had been started, the Charleston (S. C.) Society for the Promotion of Agriculture and the Philadelphia Society for Promoting Agriculture. By 1840 there were probably about one hundred of these, some quite local, others embracing states and still other districts within states. The range of their activities was great. They held fairs at which there were noteworthy ploughing matches and later "trials" of agricultural machinery, the intellectual side also being cared for by speeches of some of the leading orators of America. They gave premiums for all sorts of improvements, held meetings and financed publications concerning agriculture. Another important form of society was the American Institute, which acted as a propagator of discoveries in mechanics, a most important phase being inventions pertaining to agriculture.

Another important agency for the dissemination of agricultural intelligence and a manifestation of the alert democracy of the age was the agricultural press. This had been in existence hardly more than two decades, the first permanent paper of this character, the American Farmer, having been established in Baltimore in 1819. A review of the agricultural periodicals in the United States published by the *Genesee Farmer* in 1839 mentions seventeen as well established and besides fourteen more as newly begun. Some of the former had a national circulation (the *Albany Cultivator,* for example) and drew articles from a wide circle of correspondents. The subjects also covered a broad range, and these papers give expression in a most interesting way to the many-sided activities and aspirations of the time. The editors included some able men, among whom may be mentioned Henry Colman, of the *New England Farmer,* Edmund Ruffin of the *Virginia Farmers' Register* and Jesse Buel of the *Albany Cultivator.* Any one who cares to take the trouble to run through some of the papers edited by these men and by their contemporaries will probably agree that farmers who could support and appreciate a literature of such character were fit for large achievements. No peasants these, but American citizens.

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*See Learned's, The President's Cabinet. pp. 310-12.

The soundness of this judgment becomes the more apparent if one observes the emphasis placed upon education by them and in particular the advocacy of agricultural education. It was, to be sure, an age of agitation (at least in the North) for a universal system of education which should well fit the coming generations to meet the demands of democracy. Workingmen and Loco Foco in New York, Thaddeus Stevens in Pennsylvania, Horace Mann in Massachusetts and many other movements and leaders were advocating popular education at state expense. The following extract from an editorial published in the *Cultivator* in the same year (1839) in which Mann started the first Normal School in the United States, reveals a phase of special interest: "We cannot withhold our surprise and regret, that we have not long since established professional schools, in which our youth, or such of them as are designed to manage this branch of national labor (agriculture), might be taught, simultaneously, the principles and practice of their future business of life. * * * In the absence of professional agricultural schools, could we not do much to enlighten and to raise the character of American husbandry, by making its principles a branch of study in our district schools?"*

Books on agriculture and kindred subjects were being advertised. These included Thorburn's *Outline of the First Principles of Agriculture.* Armstrong's *Work on Agriculture* and Chaptal's *Agricultural Chemistry.* When the English translation of Liebig's *Organic Chemistry applied to Agriculture* appeared the *Cultivator* gave it a long and careful review.

The agricultural papers of the time contain many notices and advertisements concerning agricultural machinery. There were the Olds Corn Planter, Hatch's Sowing Machine and Pitt's Separator, and many others as well. Probably the most significant developments were taking place in the development of harvesting machinery. Both Hussey and McCormick had invented their reapers and were now beginning to sell them. Others also were at work on this sort of machinery, and many curious and novel ideas were being brought forth. The world had at last machines which would cut grain and which gave promise of much greater efficiency. As American farmers moved out upon the great stretches of the prairies, they had increasingly at their command machinery which was to enable them to farm on a scale undreamed of in the previous history of agriculture. The industrial revolution indeed was beginning the transformation of agricultural processes and of rural life.

PLANT BREEDING

L. R. Waldron,
Plant Breeder, North Dakota Experiment Station

Plant breeding may be defined as the practical application of the principles of genetics to plants, looking toward their improvement. Genetics, in turn, is the science of heredity. Plants already under cultivation are those with which the plant breeder usually concerns himself. His work then is ordinarily along the line of crop improvement.

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*The Cultivator, October, 1839.

The improvement of plants may be brought about without any knowledge of genetics and so it is evident that plant improvement may be carried on as an art without regard to theory. There seems to be abundant evidence of this fact by the improvement that must have been brought about in the maize plant while in the hands of the primitive peoples inhabiting this country before the white man took possession. It is easy to imagine that the changes brought about in the maize crop while in the hands of its copper-colored care-takers did not cause them much of an intellectual strain. They were no doubt clever enough to take advantage of the striking genetic changes in the plant during its many, many years under its half-wild, half-tame domestication. And we may be sure that our aboriginal brothers were not handicapped by false theories of genetics as many modern plant breeders have been and indeed are at the present time.

While we may grant that the Indians, and doubtless their predecessors, were quite instrumental in increasing the value of the maize plant without any knowledge of the science upon which their art was necessarily based, this does not preclude the possibility and indeed even the certainty that better and more rapid work would have been possible had ample theoretical knowledge been at hand. As an instance of the possibilities under the latter conditions, the work of Coville with the native blueberry may be cited. He has set the stage in a modern and scientific manner for the cultivation of the blueberry plant, a plant which hitherto has been almost entirely limited to its native swamp. By solving its peculiar soil and propagation problems he has made its cultivation practicable. We commonly think of blueberries as uniformly small and that the domestication of the plant must almost necessarily carry along with it the idea of a slow and gradual increase of size of berry. As a matter of fact, however, it is possible to start immediately with berries ½ inch or even more, in diameter, for wild bushes bearing berries of this size have been found.

From the foregoing and other facts that might be mentioned two general ideas stand out prominently. These are (1) ordinarily a plant in the wild condition shows a remarkable range of variations, affording chance for immediate propagation of satisfactory strains and (2) under uniform conditions we need not expect to look for continuous changes in the plant which requires continuous selection by the breeder. This means that considering yield of crop, let us say, a complete survey of the crop population as we have it will furnish the breeder the highest yielding natural strains available, probably for several years to come. Then if an individual carrying another character in addition to the high yields, say disease resistance, is demanded, a resurvey of the plant population will be necessary. One would be quite lucky to find all desired characters centering in a single individual. If not found in a single individual, then recourse must be had to hybridization. This work involves some technique but more particularly there is demanded a rather wide knowledge of the plant and what is required of it and also time to pick and test out the desired individuals.

Among the plant breeding projects at the North Dakota experiment station is one with smooth brome-grass, which serves as a typical illustration. A survey of individual plants during the season of 1916 showed very marked variations among the individual plants. It was evident enough that markedly different agronomic results may be expected when strains of brome-grass are grown breeding reasonably true to the diverse types represented. With this plant the task will be (1) to secure true-breeding strains of the desired types, (2) to determine the adaptation of such types to the different agronomic environments and demands as found in North Dakota, and (3) to hybridize certain type parents with a view of selecting desired strains not hitherto known to be in existence.

The Effect of Manure Upon the Composition of Corn

By R. F. Beard and J. W. Ince

(An abstract of a paper presented before the North Dakota Academy of Science at Grand Forks, May 4, 1917)

It is desirable, as far as possible, to hasten the maturity of corn when grown in regions of an average short growing season. To this end much effort has been expended in securing acclimated varieties of this crop for northern districts such as the state of North Dakota. One of the factors which may modify the growth of corn is soil fertility. It is a well known fact that corn responds directly to differences in soil fertility, making a more vigorous and healthy growth and giving a larger yield when grown upon good soil rather than upon poor land. It has also been observed that manured corn tends to mature earlier than unmanured corn. The effect of manure in hastening maturity has been noted by some investigators to be as much as 2.75% of a total growing period of 128 days for an application of 5 tons of manure per acre and 4.20% for 15 tons. A prominent seed man in this state has said that he always uses well manured land for seed corn for this reason, namely, to shorten the growing period of the crop. The common practice of growing corn upon manured ground may be a partial recognition of this feature of the mutual relation of corn and manure.

The influence of added fertility is noticeable in the composition of the crop as well as in its physical appearance. It has been shown by a number of investigators that corn which has been manured is richer in nitrogen and phosphorus compounds and carbohydrates than corn which had not been manured. The attention of the writers was brought to this question of correlating the composition of corn with the effect of manuring in a series of corn analyses made upon the 1915 and 1916 crops at the North Dakota Agricultural College. It was noticed at that time that manured corn had a higher percentage of dry matter and that the proportion of crude protein and carbohydrates was greater than in unmanured corn. This same statement applied in greater degree to the ears of the samples taken. These analytical results supported the obvious field conclusions that the manured corn was more advanced in maturity than the unmanured. The relation, however, was more strikingly manifest when the analyses were placed upon the dry matter basis. It was then apparent that there was a greater relative amount of carbohydrates and a smaller relative amount of protein in the manured corn. This emphasized the difference in maturity inasmuch as it is a general rule that nitrogen compounds predominate at the first part of plant life and carbohydrates are relatively more abundant towards the end of the growing period. In other words, the more mature the corn the greater the proportion of carbohydrates and the less the amount of protein when considered upon the dry matter basis. When, however, the results are computed to the original basis, the percentage of protein and carbohydrates steadily increases with the growth of the plant. It would seem, therefore, that the application of manure is a means of modifying the composition of corn and securing a crop of earlier maturity than could otherwise be obtained, other conditions being equal.

The nitrogenous constituents, generally summarized under the name "crude protein," are without doubt the most valuable part of a plant both as regards monetary value and physiological importance. When produced under the most favorable circumstances on well tilled and fertilized soil, the dry matter of corn fodder contains from 8 to 9% of crude protein, a low figure when compared with other crops. It is therefore especially desirable to be able to increase the protein content of this crop, and this is an accomplishment which has been shown to be possible by the use of manure, altho, to be sure, the percentage of increase is relatively small. The mutual relationship of corn and manure has thus been demonstrated to be of some importance, since manure apparently increases the yield of dry matter of corn and its different constituents, especially protein, and also apparently causes corn to ripen at an earlier date. There would seem to be no necessity of dwelling upon the importance of these two results for the state of North Dakota, but they are all the more apparent in the face of the present food crisis of the world.

CAMPUS AND ALUMNI

Mr. T. H. Quigley, who succeeds Mr. R. C. Hoisington in charge of all the manual training work in this school, is a graduate of the University of Indiana, and has done some post-graduate work in manual arts in the University of Wisconsin. In preparation for the teaching of manual arts, Mr. Quigley went into the factories of the American Hardware Company of New Britain, Connecticut, and afterwards served as a journeyman in all lines of hardware manufacturing. Mr. Quigley has also had a large practical experience in carpentering, joinery and concrete construction and has successfully served as instructor in manual arts in the high schools at Dallas, Iowa, Hobart, Indiana, and Fargo, North Dakota.

Mr. Thomas J. Smart has been elected assistant professor of Education and English. Mr. Smart is a graduate of the University of Minnesota, has his master's degree from the same institution and has had a very successful teaching experience in rural and village schools, in the Kindergarten Normal Training School of Miss Stella Wood of Minneapolis, in the Mankato State Normal and in the College of Agriculture at the University of Minnesota. Both by training and experience Mr. Smart should be able to render most excellent assistance in the organization of the work of the new courses in education.

During the summer, a group of eight Little Country Theatre Players made a tour of the state, presenting "Back to the Farm." Forty distinct communities in twenty-two counties of the state were visited and between 6,000 and 7,000 people witnessed the different presentations. The tour was a great success, socially, financially and in its appeal to its audiences. A similar tour is in prospect for next year.

Homer Dixon, '15, who for two years has had charge of the work in agriculture in the high school at Perham, Minnesota, is now associated with the Walsh County School of Agriculture at Park River. Besides his actual class room instruction, Mr. Dixon is doing a good deal in extension work in agriculture.

COLLEGE AND STATE

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Teachers are invited to send in any questions pertaining to the teaching of agriculture or other vocational subjects in the public schools. Inquirers will be assisted in every way possible.

Agricultural Texts for the High School

O. O. Churchill, Professor of Agronomy

Textbooks treating agricultural subjects are of recent introduction. Fifteen or twenty years ago there were no books of an agricultural nature suitable for the class room. It is not to be expected that in this short time books suitable for all conditions have been published.

The first books dealing specifically with agricultural subjects were published to meet the demands of the students in the colleges of agriculture. At first these books were very general in nature. They told how to do things on the farm but they did not give the "why" of the practices recommended.

Gradually the different phases of agriculture have been split into rather definite subjects. To meet these conditions an entirely new set of books was published. These books deal with special subjects such as soil physics, soil fertility, crops, dairying, feeds and similar topics.

These agricultural books were to be used in the college class room, and topics were treated in a technical manner. To properly use them presupposes a good elementary and high school training. They require at least an elementary training in the sciences relating to agriculture such as chemistry, physics, botany and physiology. Such books should never be used in the high school.

Yet as unsuitable as these texts are, many are used in the high school and especially in the agricultural high school. The instructor likes to use the text with which he is familiar. I have known many instances of high school instructors "going thru" the same books that are used in colleges and in much less time. It is mere folly to attempt the same books for students of all grades.

Fortunately there have been published within the last few years several acceptable texts to meet the requirements of the agricultural high schools. But not all the books published on agriculture are of an acceptable nature. Too many writers with little agricultural information have been getting aboard the agricultural band wagon.

Now the authors of agricultural books, as well as other authors, have written their books to sell. They have tried therefore to appeal to the largest class of purchasers. The college texts came first. The elementary books on agriculture came next. The field for the high school is still somewhat unsatisfactorily filled. There are several reasons for this.

In the first place the amount of time devoted to agricultural subjects in the different high schools is not uniform. Instructors generally try to cover the entire field of general agriculture regardless of the time at their disposal. This leaves the writers in a peculiar position—there is little demand for a definite type of text suited to high school work.

The college texts on agriculture are not suitable. Nor does an elementary text covering the entire field of agriculture meet the purpose. For the agricultural high school giving three or four unit credits of work there are several good texts. Those used in the secondary courses in the colleges of agriculture are entirely satisfactory. For such schools the following division of subject matter, in semester order, is satisfactory from an agricultural viewpoint:

1, crops; 2, horticulture; 3, animal husbandry; 4, soils; 5, farm mechanics; 6, farm management; 7, plant and animal improvement; 8, special problems and home projects.

For these schools the following texts are very good:

Productive Farm Crops, Montgomery; Soils and Fertilizers, Snyder; Soils, Whitson and Wolster; Breeding, Marshall; Farm Management, Bas; Vegetable Gardening, Green; Farm Mechanics, Davidson; Dairy Farming, Michaels; Dairy Farming, Eckels & Warren.

In many high schools only 1½ to 2 unit credits in agriculture are given. This will require a revision of time and subject matter. For these schools, I doubt very much the wisdom of trying to give instruction in the entire field of general agriculture.

For the school giving 2 unit credits of work the following division of time should prove satisfactory: crops, soils and management, 2 semesters; horticulture, vegetable gardening, 1 semester; live stock, dairying, 1 semester.

The reason for devoting so large a part of the time to soils and crops is that these subjects are best suited to secondary school work. The illustrative material is easily obtained and at a small cost.

If less than 1½ units are devoted to agriculture, it would be well to confine the instruction to crops, soils and management.

For these groups of high schools there are no very satisfactory agricultural texts. Warren's Elements of Agriculture is an excellent book for one or two semesters of work. High School Agriculture, by Mayne and Hatch, is also good.

There are two very good laboratory manuals suitable for high schools. Laboratory Exercises in Principles of Agriculture by Hopt and Spafford covers the field the title indicates in an excellent manner. Practical Lessons in Agriculture by Ivins and Merrill is also very good.

In the briefer courses bulletins may well be substituted for agricultural books. Many of these bulletins are prepared in the same manner as texts and they may be obtained free. The North Dakota Agricultural College and Station has bulletins on practically all agricultural subjects. Copies may be had for the asking. The United States Department of Agriculture has published many very useful bulletins, some of which are here listed. The abbreviations used are:

O. E. S.—Office of Experiment Stations.

U. S. D. A.—New Series Departmental Bulletins.

U. S. B. Ed.—U. S. Bureau of Education.

B. P. I.—Bureau of Plant Industry.

B. An. Ind.—Bureau of Animal Industry.

Federal bulletins may be secured by addressing U. S. Dept. of Agriculture, Washington, D. C.

Educational

The Georgia club. U. S. B. Ed. 23, 1913.

The county schools of agriculture and domestic economy in Wisconsin. O. E. S. 242.

Consolidation of rural schools. U. S. B. Ed. 30.

County-unit organization for the administration of rural schools. U. S. B. Ed. 44, 1914.

The use of land in the teaching of agriculture in secondary schools. U. S. D. A. 213.

School gardening and nature study in English rural schools and in London. O. E. S. 204.

The rural school system in Minn., U. S. B. Ed. 20, 1915.

Consolidated rural schools and organizations of a county system. O. E. S. 232.

The American system of agricultural education. O. E. S. Cir. 106.

Community work in the rural high school. Yearbook 1910.

The Massachussetts home project plan of vocational education. U. S. B. Ed. 8, 1914.

Educational contests in agriculture and home economics. O. E. S. 255.

Home projects in secondary courses in agriculture. U. S. D. A. 346.

The Home

The conveniences for the farm home. Farmers 270.

The North Dakota farmstead, its arrangement and adornment. N. D. Cir. 10, 1916.

School Exercises

School exercises in plant production. Farmers 408.

The propagation of plants. Farmers 157.

A primer of forestry. Farmers 358.

Exercises in elementary agriculture, plant production. O. E. S. 186.

Collection and preservation of plant material for use in the study of agriculture. Farmers 586.

The use of illustrative material in teaching agriculture in the rural schools. Yearbook 1905.

Vitality of buried seeds. B. P. I. 83.

Some exercises illustrating some applications of chemistry to agriculture. O. E. S. 195.

Weeds

The eradication of the bindweed or wild morning glory. Farmers 368.

Controlling Canada thistles. Farmers 545.

Weeds. S. Dak. 150.

Quack grass eradication. Minn. 151.

Thirty poisonous plants. Farmers 86.

Dodder in relation to farm seeds. Farmers 306.

Weeds used in medicine. Farmers 188.

Weeds: how to control them. Farmers 660.

Weed studies. N. Dak. 62.

The eradication of quack grass. Farmers 464.

Plant Diseases

Lessons from the grain rust epidemic 1904, Farmers 219.

The smuts of wheat, oats, barley and corn. Farmers 507.

Fungicides. Farmers 243.

Some common disinfectants. Farmers 345.

The prevention of stinking smut in wheat and loose smut in oats. Farmers 250.

The rusts of grain in United States. B. P. I. 216.

Insects

Injurious insects. Minn. 88, 1914.

The Hessian fly. Farmers 640.

Rodents

How to destroy rats. Farmers 369.

The relation of coyotes to stock raising in the west. Farmers 226.

Cottontail rabbits in relation to trees and crops. Farmers 702.

Bees

Bees. Farmers 379.

Birds

Our grosbeaks and their value to agriculture. Farmers 456.

Fifty common birds of farm and orchard. Farmers 513.

Some common birds useful to the farmer. Farmers 630.

Some common birds in their relationship to agriculture. Farmers 54.

Birds. N. D.

Seeds and Seed Testing

A device for sampling grains, seeds and other material. U. S. D. A. 287.

Imported low-grade clover seed and alfalfa seed. B. P. I. Ill., part 3.

Alfalfa seed. Farmers 194.

Seed testing. O. E. S. Cir. 34, revised.

Seed control. N. D.

School lessons in corn. Farmers 409.

Grades of commercial corn. U. S. D. A. 168.

Crops

Dry land grains. B. P. I. Cir. 12.

Cropping systems for wheat production. N. D. 100.

Cereal crop experiments. N. D. 75.

Cereal experiments at Dickinson, N. D. U. S. D. A. 33.

Cereal crop experiments at Williston, N. D. U. S. D. A. 270.

Spring wheat in the great plains area. U. S. D. A. 214.

Varieties of hard spring wheat. Farmers 680.

Growing hard spring wheat. Farmers 678.

Durum wheat. Farmers 534.

Milling and baking tests. N. D. 82.

Milling and baking tests with durum wheats. Farmers 412.

Oat culture. Farmers 424.

Oats. Farmers 420.

Barley culture. Farmers 443.

Barley on the great plains. U. S. D. A. 222.

Test of corn varieties on the great plains. U. S. D. A. 218.

Pop corn for the market. Farmers 554.

Pop corn for the home. Farmers 553.

Emmer. Farmers 139.

Winter emmer. Farmers 466.

Group classification and varietal descriptions of some American potatoes. U. S. D. A. 176.

Potato culture. Farmers 36.

Variegated alfalfa. B. P. I. 169.

Sweet clover. U. S. D. A.

Canadian field peas. Farmers 224.

The field pea as a forage crop. Farmers 690.

Red clover seed production. U. S. D. A. 289.

Bur clover. Farmers 693.

Vetches. Farmers 515.

Leguminous plants. Farmers 16.

Crimson clover. Farmers 579.

Sudan grass as a forage crop. Farmers 605.

Milo. Farmers 322.

Non-saccharine sorghums. Farmers 288.

Broom corn. Farmers 172.

Saccharine sorghums for forage. Farmers 246.

Better grain sorghums. Farmers 488.

Millets. Farmers 101.

Native pasture grasses of the U. S. U. S. D. A. 201.

Cassava. Farmers 167.

Drug plants under cultivation. Farmers 663.

Sugar beets. Farmers 52.

Rape. Farmers 164.

Farm Management

Replanning a farm for profit. Farmers 370.

Dry farming investigations in western N. D. N. D. 110.

Principles of dry farming. N. D. 96.

Dry land agriculture. B. P. I. 120.

Agriculture in the great plains. B. P. I. 215.

Crop production in the great plains. U. S. D. A. 268.

Tillage and rotation experiments at Nephi, Utah.

Marketing

Suggestions for parcel post marketing. Farmers 703.

Cost of producing farm crops. N. D. 104.

How to use farm credit. Farmers 593.

Live Stock

Market classes of horses. B. An. Ind. 37.

Breeds of draft horses. Farmers 619.

Beef breeds of cattle. Farmers 612.

Breeds of dairy cattle. Farmers 106.

Pig management. Farmers 205.

Poultry management. Farmers 287.

Standard varieties of poultry. Farmers 57.

How to select a sound horse. Farmers 779.

Judging horses as a subject of instruction in secondary schools. U. S. D. A. 487.

Judging dairy cattle as a subject of instruction in secondary schools. U. S. D. A. 434.

Farm sheep raising for beginners. Farmers 840.

Breeds of swine. Farmers 765.

Standard varieties of chickens. Farmers 806.

Turkey raising. Farmers 791.

Goose raising. Farmers 767.

Horticulture and Forestry

The care and improvement of the wood lot. Farmers 711.

The wind break as a farm asset. Farmers 788.

A primer on forestry. Farmers 358.

The farmer's vegetable garden. N. D. Cir. 5.

The farm fruit garden. N. D. Ext. 9.

Bridge grafting of fruit trees. Farmers 710.

Soils

Extension course in soils. U. S. D. A. 335.

The choice of crops for alkali land. Farmers 446.

Silos and Silage

Home made silos. Farmers 589.

The silo and its construction. N. D. 98.

Pit silos. Farmers 825.

The making and feeding of silage. Farmers 556.

Crop and Animal Improvement

Principles of plant breeding. B. P. I. 165.

Good seed potatoes and how to produce them. Farmers 533.

Horse breeding and suggestions for farmers. Farmers 803.

Breeding drought-resistant crops. B. P. I. 196.

Agricultural Engineering

Earth roads. Farmers 136.

Repair of farm machinery. Farmers 347.

Concrete fence posts. Farmers 403.

Concrete on the farm. Farmers 461.

Paint on the farm. Farmers 474.

Windmill electric lighting and power. N. D. 105.

Laboratory exercises in farm mechanics for agricultural high schools. Farmers 638.

Minor articles of farm equipment. Farmers 816.

Poultry house construction. Farmers 574.

The sanitary privy. Farmers 463.

Barn plans. N. D. 97.

In choosing a text for the agricultural high school, local treatment is of minor importance. Of course subject matter pertaining to affairs of local interest should be chosen. The general principles of agriculture do not vary.

The reasons for plowing are the same here as in Florida. But the time and depth of plowing may vary. This is also the case even in limited areas. Sandy and clay soils should not be handled in an identical manner even on the same farm.

It will pay the teacher of agriculture to use great caution in the selection of texts. The title and covers of a book give no indication as to the contents.

Art in an Agricultural College

Maie Douglas Rindlaub

An erroneous idea seems always to have existed that the man who tills the soil must not lift his eyes from the ground, that he must be inferior to the city dweller; in fact, civilized means citified. Nothing could be further from the truth; but the idea that the city has some mysterious gift to bestow, which could never be found on the farm and which would deliver him from the hateful association with things ''countrified,'' ''farmer'' or ''hayseed,'' has led many a boy or girl away from home. One object of our teaching is to dispel this illusion, to teach him to separate the dross from the gold, to see the beauty about him, to make the country home the most beautiful place on earth, and to appreciate the manifold advantages of his position; in other words to attain the pure joy of living. The nation is becoming awake to the necessity of art in the lives of the people, as it is wakening to many other great facts of life.

When a boy did you ever carve from a stray piece of wood an object of your vision, a boat, a dog or horse, or a doll for the sister? Has any accomplishment in later life afforded you greater joy or satisfaction? The wooden toy was a creative expression. There was joy, earnestness and sincerity in the work. If those qualities could enter into all the work of men's hands, the world would be a better place to live in. That piece of wood was worthless when you found it, but under your hand it became imbued with a power to excite interest and to impart pleasure.

A tree as it stands in the forest has greater esthetic value than can be given to any object by the hand of man; hewn down, it has only the value of its cubic feet of wood. If sawed into boards its material worth is increased. If made into beautiful furniture the value is again heightened; but let the same piece of wood pass into the hands of an artist, be carved into a magnificent altarpiece for some great cathedral and the value is so enhanced that we forget the material altogether in the idea which is exexpressed, for thru the inspiration of his genius, his special talent and training the artist is able to approach, altho never to equal the perfection and beauty of a divine creation.

Creative genius is possessed in some degree by all children, but if allowed to remain undeveloped, by few adults. People can be taught to draw, to paint, to design, but the artist is born and not made. There are many artists in the world who have never touched a brush or chisel, and the great American artist may now be out upon these plains of ours, only waiting for a chance to develop his natural gifts. It is our duty to discover him.

Altho genius is rare any person of ordinary intelligence can gain artistic appreciation, and the minute this light appears a new world unfolds before him. He sees beauty all about him, in the sky, in the trees, in the boundless prairies; and the beauty to which he has hitherto been impervious begins to manifest itself in his surroundings. He sees proper line, proportion and color; he comes to realize why some surroundings have jarred upon him and tired him and why others have pleased, quieted and rested him. He not only learns to see and appreciate beauty but also to express it. He knows how certain things should be done and why; he learns how to select, to arrange and without adding to expenditure to make his surroundings tasteful and beautiful, for the idea that a thing to be beautiful must be expensive is false. Best of all he has found that the mystery of art is no mystery at all, and he is at last on an equal footing with his city brother.

This knowledge is also a practical asset, for it costs no more to put a window in the right place, when a man builds his home, than in the wrong, but it adds materially to the value of the property. For the woman, it costs no more to have the line and color of a dress beautiful and adapted to her personality, but it adds to her charm and self-respect, and marks her a woman of taste.

The very isolation of the farmer and his family makes this phase of education the more important. They must, of necessity, be versatile; they should be resourceful, have taste and judgment and be able to create.

A skeptic once asked a modern painter, "Do you really see all the color that you portray?" The painter replied, "Don't you wish everyone could see it?" We do not truly see until we are taught to use our eyes and the study of pictures is the surest way to learn of the beauty around us.

Can a farmer's work be less efficient because he feels a thrill of joy at the beauty of the sunrise, and passes to his daily task with a song, or because he beholds the harvest moon, rising just at sunset, with an intelligent appreciation of the beauty of the scene as well as thankfulness that he may have light to gather in his grain? An appreciation of beauty adds joy to labor and lightens every toil. Art is practical but never material. Let us remember that the hand of the most practical and efficient nation in the world today, which destroyed the Rheims cathedral, also destroyed women and children. Let us therefore be something more than practical and efficient.

No class of men have served their countries more faithfully in this great war than the artists, by fighting in the trenches, where many have perished, by designing war posters, and by the new art of camouflage, with which they are able to paint an object out of sight, or throw a veil of illusion about it, concealing it from the enemy. Art is the very opposite of war. It is the expression of the highest, purest, most elevating thoughts of man. To keep art alive has never been of such vital moment as today.

Cooperating to Save Food

Katherine Jensen, Home Economics
Director for North Dakota

The United States department of agriculture has issued farmers' bulletins on how to select foods and various allied subjects, viz:

808 What the body needs.
817 Cereal foods
824 Foods rich in protein
565 Cornmeal as a food and ways of using it
142 Principles of nutrition and nutritive value of food
871 Fresh fruits and vegetables as conservers of other staple foods.

The above and many others may be obtained by writing to the Superintendent of Documents, Washington, D. C., and sending five cents in coin for each copy. These bulletins will help the homemaker in planning her meals wisely so that they may be adequate for supplying the materials needed. Some materials may serve as a substitute for meat and others may be used in place of wheat. Habit and custom have aided the woman in the past but now she is urged to use materials quite foreign to her everyday practices. The bulletins mentioned will give the woman assurance and prevent her from making any serious mistakes.

The woman's patriotism has been appealed to, and she is assisting the nation in her best capacity but the change in the nature of foods served is going to necessitate a change in the daily habits of people. The depletion of five staple foods makes substitution a necessity. The call from abroad comes, already, for twice as many cereals as this country ordinarily exports. The women who direct the households must likewise direct the conservation of these cereals. The breakfast menu need not include wheat products such as farina, cream of wheat, and puffed wheat, for corn meal, hominy, oatmeal, barley and other local cereals, if skillfully prepared and judiciously served, will make a breakfast suitable, pleasing and adequate for the various members of the household.

The breakfast gems or griddle cakes will be as much in demand if in place of 100% wheat flour a generous proportion, about 50%, of rye, corn meal, bran, oatmeal, rice, barley flour, or whole wheat is added. The various so-called war breads, corn meal, rye, potato, rice, and oatmeal where from 15 to 20% of these materials have been used can supplement the white bread. If these war breads are properly made they are wholesome and palatable. A great variety of desserts can be be made using substitute flours or left-over breakfast foods to reduce the amount of wheat flour commonly used.

The home card of instruction states, "We must send more meat." This can be done without embarrassing the United States if we economize on beef and pork and use instead greater quantities of vegetables high in protein (such as beans and peas), more fowl, fish, cheese, nuts, milk and milk products (cottage cheese). If the homemaker will use more milk, whole or skimmed, even at present prices, she will find it less difficult to furnish the family an adequate diet at a moderate cost.

Since lard and butter are on the demand list it will be necessary to decrease their use and increase the use of cottonseed oil, peanut oil, olive oil, crisco or other substitute fats. The use of these fats in cooking does not result in an inferior product.

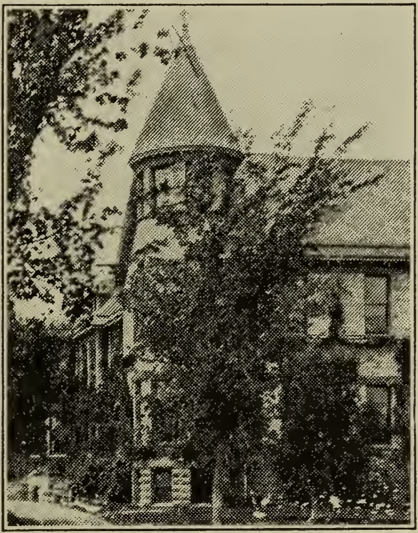
Sugar is needed in the warring countries and a sugar shortage is threatening our country. The interested housewife will begin using less sugar and more dark syrups, honey and maple products. If this response to the nation's request does not come willingly and quickly the result will no doubt be that the government will dictate daily food rations as is being done in Europe.

In many instances the cost of articles which have been made in part from substitute products is increased but the problem at this time is not to save in dollars and cents but rather to save *wheat, meat, fat, sugar and dairy products.*

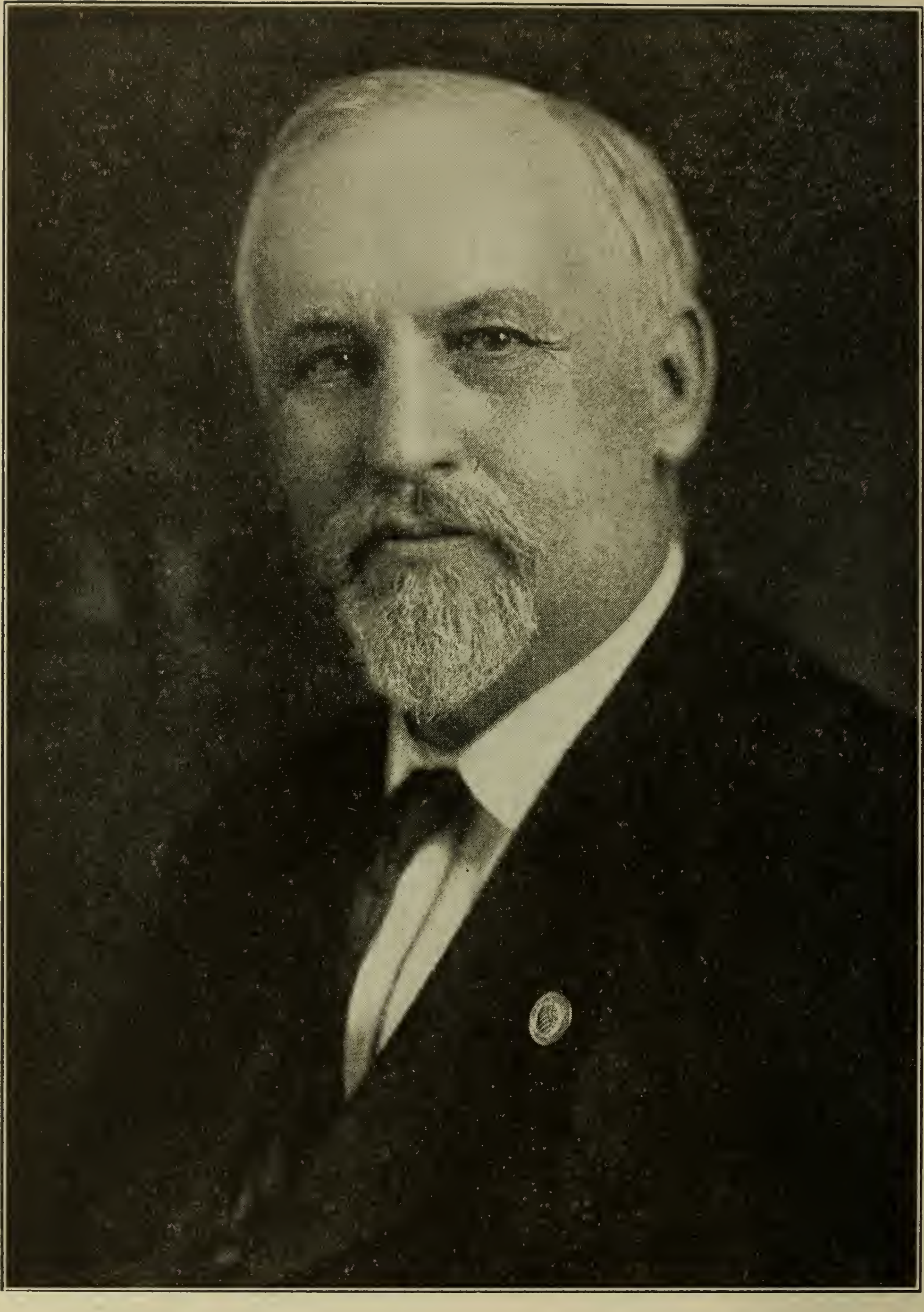
The extension department of the North Dakota Agricultural College has compiled material available to the women of the state which is full of helpful suggestions. This together with the material from the United States government should aid the woman in the home in the solution of her important problem, national conservation. This is not a fad to be tried until the newness wears off and is then forgotten but a serious duty to be worked at each day, each week and each month. If each woman enrolled with the government will conscientiously follow the suggestions of the home card sent to her by the United States food administration her efforts will result in the country having a large surplus of the foods needed for exportation.

Any woman may obtain tried recipes for all kinds of war breads by addressing Extension Department, North Dakota Agricultural College, and requesting the same.

Alumni Issue



North Dakota
Agricultural College



E. F. Ladd.

Greetings

ALUMNI and Former Students of the A. C.:

In behalf of the Regents and Faculty, I extend greetings to you and best wishes for a prosperous and profitable year. We glory in your achievements, for through success to you comes honor to your Alma Mater. As you succeed and attain an honorable place in service to your fellowmen, to the state or nation, the College gains prominence and assumes a more important place as an educational force in the nation.

It was but twenty-three years ago that the first class passed out from the doors of the College and took their places in active affairs. Twenty-three years is but a short period in College history, and yet there are many among you who have gained prominence in various fields of activity. Each year will now add luster to the College as your numbers increase, and as maturity and experience bring you new opportunities for greater service. Remember that real and lasting success comes to those who cheerfully serve through gracious giving of themselves in the fullest possible service, and not alone through the accumulation of wealth.

The present are trying times in the affairs of our nation, of our state, and of the College, but our boys have responded nobly to the nation's call and today there are a goodly number of the alumni and former students in the country's service. These will, I am sure, be heard from to the credit of the College, for they have, through training and experience, developed a spirit of patriotism, loyalty and service to their country and their country's associates that will not be excelled by that of men from any other part of the land. Our prayers should be ever for you, who are giving of your lives, that our ideals of a true democracy, may be established throughout the world.

There can be no permanent, lasting peace until justice, liberty and righteousness are assured to every human being, as well as every nation, whether large or small. It may not be our privilege to be with the boys in the front rank, but we each have a sacred duty at home that we must not shirk, if success is to crown the efforts and sacrifices of the boys at the front.

Let us not forget, Faculty, Alumni and Students, safe in our home land, the sacred responsibility laid upon us because of the opportunities in training and leadership that have come to us, as students of the College and honored citizens of our state.

The President

The Relation of the College to the State

Hugh J. Hughes, '09

What relation should the college bear to the state? This is a question of supreme importance at a time when the state itself is undergoing the pangs of a new birth—when civilization is being recreated, its purposes restated, its objective point revisioned.

I think I may as well confess at once to the view that the modern college has missed in very large measure its opportunity; and I believe that this failure to measure up to the needs of the situation is due in large part to the worship of the traditional, to the carrying along of excess baggage, bequeathed to us by our educational forbears and still more largely to a failure to recognize the broader foundations of all knowledge and culture.

I am not now thinking of such details as the ancient languages, mathematics, history or any special one of the studies that fall within the collegiate curriculum. I am thinking rather of impelling motives, that determine what subject matter shall be taught under a given course of study; whether, for example, the student who devotes three years to history shall spend that time delving in the tombs of the ancients, or acquainting himself with those streams and courses that have finally developed into the great tide of modern business life.

To use another simile, it seems to me that the containers are fairly well chosen, as mathematics on the one hand, history on the other, economics, sociology, literature, the more recent sciences; but that we may gravely question whether the content matter is well chosen, properly associated, and finally, whether it is presented by teachers having a sufficiently wide vision to create in the mind of the student a constructive train of thinking. The college should be a laboratory of progress, it ought above all other things to visualize to the student the large part which initiative, imagination, spirit, enthusiasm, play in the creating of new conditions and in the solving of new problems.

I am not sure that the college takes its viewpoint from Grub Street; on the other hand, I feel that there are no more enthusiastic, no more idealistic men than those who direct our higher institutions of learning, but it is in fact against a certain phase of this idealism that I wish to protest, namely, that mistaken zeal for scientific accuracy without objective, for research without ultimate aim, for a class exclusiveness and a detachment from essentially practical things of life, which causes too large a percentage of the instructional force of our colleges to be deemed by the hard-headed business man to be impractical and visionary. I am not sure whether this is the fault of the school, passing over from one generation of students and professors to another, or whether because the life of the professor appeals particularly to a certain type of mind to whom the temptation to run in narrow grooves frequently becomes overpowering.

The student brought in contact with such men—men intensely interested in certain narrow aspects of educational effort, men whose whole lives are devoted to the minutiae of things, men who concentrate all their energies on what are after all mere details, too frequently gets an entirely wrong conception of his own purpose in college. Rather, perhaps, he gets an already acquired wrong impression intensified and fixed.

Probably the average freshman goes to college with the idea that it is going to assist him to make a big business or social mark in the world. He has one certain objective and he is more than willing to put aside everything else to reach that goal. The ideal college takes Mr. Freshman, yanks him off his feet, knocks him breathless with the surprise of the sheer bigness of the world he is living in and makes him forget for the time being that there ever was such a thing as the end he set out to gain. If it can keep this up, if it can stir him so profoundly with the desire for a comprehensive understanding of life and its opportunities that he begins to reach out for himself after a correct vision of things. it does not matter so much whether he studies Homer's Iliad or the latest arrived science. He is safe, and his future may be predicted as moving along progressive and constructive lines.

I am inclined to think, however, that the average boy getting into college soon finds himself deeply in love with some particular branch of collegiate work. For example, natural science, and that the tendency of the day is to urge him to specialize before he has laid the necessary broad foundation which a college man should possess. I heard two students discussing, the other day, the matter of whether or not the courses offered at a leading agricultural college were satisfactory, and they raised the very point here mentioned. One student was very much opposed to the courses offered because it "wasted" one perfectly good period for two years on the foolish studies of history and political economy. The other student had not thought about the matter before but rather naturally agreed with his older friend. Both boys were earnest young fellows and anxious to get into the world's work. Neither of them saw the essential necessity of knowing what other men had done or why other men are doing the world's present tasks. Without entering a special plea for the sciences the boys felt were unnecessary to their own chosen calling, I submit that the average man's reaction to the events of the present day shows a woeful lack of elementary understanding of the life and constitution of the state.

Put it this way, too much time has been devoted to educating the student for himself; not enough time, not enough thot has been given to the question of educating the student to serve the state and the society of which he is a part. And again it seems to me that fundamentally this is due to a lack of broad foundations; a knowledge lacking in essentials, the lack of a suitably broad outlook on the part of faculties and regents and college presidents, and alumni and of the parents of the young men and women who are sent to these institutions.

Can we change the outlook? I believe we can. I believe it is changing under the pressure of present day conditions. In the World that Was individual success was looked upon as the big thing; today individual service is pretty much all that counts, and just as soon as we change the ideals of education from those of securing success to those of rendering service the big desirable thing will be set in way of accomplishment.

Details of a curriculum naturally adjust themselves to the controlling impulses from above. I feel that for the future we shall waste very little time on the non-essentials. By non-essentials I mean those things which may easily be acquired elsewhere than in a college laboratory or class room. By the non-essentials I mean, too, those things that merely fill up the mind instead of making the mind a dynamo of constructive and progressive energy. By non-essentials I mean those silly little ideas of caste and preference and mental aristocracy that pervade even our best institutions of learning. On the other hand by essentials I mean everything that can flow into and broaden and strengthen the intellectual and moral and spiritual life of the student. I believe that we have erred profoundly in the degree in which we have pushed our non-sectarian instruction. We have made the mistake of thinking that because we could not discuss sects and isms in college and in the preparatory schools that it was impolite and indelicate to discuss God. We have tried to build a temple of science on a floating bog of theory beneath which, if it is to stand, the foundation of a faith in God must reach down to the everlasting rock of truth.

We have been following rather too rapidly and dangerously the same road that has led the Germans to repudiate God in favor of Kultur. Science does not eliminate Him and does not explain Him. It needs Him to explain it. This to my mind is the one profound revelation brought to our minds by the present war. We have been dilettantes believing that physical and social evolutionary theories had solved the problems, social and moral and physical, of the ages.

Standing at the apex of the educational system of the country, we men of college training and profession have taken from the boy and girl the stories of faith and honor taught in the old fashioned way and have replaced them with our cold, abstract worship of law and order. We have not gone far enough. We have not made it our business to lead the boy and the girl to see that no matter what our science teaches, no matter what mental readjustments the years may bring, no matter what is proved untrue and cast aside, the poet was everlastingly right when he wrote of a God standing behind the shadows, keeping watch above His own. So to my thinking, college must be a leader of the state not only in scientific thought, not only in social vision, not merely in cultural training, but in pointing the way back to God—no God such as the Germans worship, a tribal duty that smites and slays for His chosen people, but the God of science, patient, exact, just; the God of history—a God that unfolds from age to age new vision and new desire, a God that lifts men slowing from the savage tribe to the cultured state; the God of sociology—a God that breathes the spirit of fairness between man and man, a God that makes life wholesome and better as the ages pass; the God of Calvary—a God whose law is love, whose highest expression is found in the forward march of that democracy our education is called upon to defend and to lead still farther along the paths of the safe, assured future.

I am saying this, not as a religious zealot, but as a business man tempered by the experiences of the passing years. I am saying it as one who has studied with what care he might the creative and destructive forces that are abroad in the world today, and I believe that only as the college accepts in all humility, coupled with the zeal of the crusader of old, this newer and larger mission, will its relationship to the state be that which is required of it by the onmarching demands of the age.

Wisconsin as a Factor in the Nation's Supply of Dairy Products

Carl E. Lee, '97

The agricultural people of each state have their own problems to deal with as a unit in the present conflict in order to efficiently serve the nation in the production of food.

North Dakota is therefore called upon to furnish more and better wheat and other small grains, while Wisconsin, because of its past record, must do its share in the production of butter, cheese and other milk products.

Our ability to furnish these necessary commodities will, in a large measure, be dependent upon climatic conditions, labor, available cash or credit, and whether or not each individual farmer is a master of his profession and willing to sacrifice for a common cause.

Grant that the primary object for the immediate future is in aiding the government in all emergency measures, yet the question of the future development of agriculture and a study of all the factors that bear a relation to that industry must not be overlooked.

Farming as a business in the future, whether it be wheat, corn, or dairying, must be conducted on a different basis than in the past, if those engaged in the work meet with a fair degree of success. Acres under cultivation, the size of the dairy herd, the number of men employed or capital invested will not determine success, but rather the returns for labor and capital invested. Efficiency will be the watchword and the man who in his line of farming in the past has been in the "rut" or has merely made both ends meet must change his methods or the economic law "the survival of the fittest" will do its separation. The younger man who will take up the work where the father left off cannot always follow in the same footsteps because of changed conditions. He may be called upon to make the one hundred sixty acre farm produce twice what it formerly did and the eight cow dairy to bring in the returns of sixteen.

The Dairy Industry Not a Side Line

The dairy industry of Wisconsin has become the most important branch of agriculture. The early history is the same as that of any other state. The farmers preferred to grow small grains and rob the soil of its fertility. Ex-Governor Hoard, the father of better and more dairying, once said: "What saved Wisconsin from the wave of destruction in farm fertility and land value was the coming of the cow." Fifty years ago, according to Hibbard, "A single pound of marketable butter was often worth more, in Madison, the site of the state capitol and its university, than a bushel of wheat, yet with a small investment in cows it was entirely possible to turn the produce of an acre into seventy-five pounds of butter instead of eight or ten bushels of wheat, and the cash outlay for maintaining the dairy after it was once started was not equal to the expense of raising wheat. In spite of these possibilities, and they were thoroughly tested, butter was shipped from other states to Wisconsin, even as late as 1860, while for half or more of the farmers to buy butter, cheese and even milk was so common as to excite no comment."

In 1872 Governor Hoard issued a call that resulted in the organization of the Wisconsin Dairymen's Association. The southern portion of the state at that time manufactured in the neighborhood of 3,000,000 pounds of cheese and not to exceed 6,000,000 pounds of butter. Most of this was probably made during the summer months in the farmer's kitchen by the housewife and stored in the cellar until offered for sale at the grocery store. Very little of the manufactured product probably reached Chicago. The first refrigerated car for the transportation of butter went out of the state in 1874. In 1915 a train of refrigerator cars more than forty miles long was required to move the butter to the markets of the nation.

Early Methods Retarded Growth

In the early days the general method of handling the milk and the manufacture of the dairy products had a retarding effect on the progress of the dairy industry. The attempt to place upon the market a filled cheese, not labeled as such, would have ruined the industry. But since its manufacture has been made prohibitive, the cheese industry has grown to its present magnitude. The quality of butter and cheese is high because of improved methods of handling the product on the farm and at the factory. Coupled with this has been the determination on the part of a large number of factory owners to make an honest, sanitary food product.

The state today has the distinction of furnishing to the nation fully one sixth of the creamery butter, three-fifths of the cheese and approximately one half of the condensed and evaporated milk, besides furnishing to the city of Chicago a large amount of the milk and cream for table use.

There are, approximately, 177,000 farms, 1,700,000 dairy cows, 900 creameries, 2500 cheese factories and 50 condensaries. This does not include various milk plants dealing in fluid milk and cream for the table. The 1917 figures are not available, but when they are compiled, the aggregate income from the sale of dairy products, including the value of skimmed milk and whey, will undoubtedly pass the 160,000,000 dollar mark.

There never has been a time when the development of the industry appeared to be at a standstill. In 1909 the output of creamery butter was 105,307,356 pounds and in 1915, 124,636,071 pounds.

In 1909 the number of pounds of cheese made was 145,171,235, in 1915, or six years later, 234,929,037 pounds were made, an increase of nearly 90,000,000 pounds.

There are certain localities in the state where cheese has always predominated, namely, the lake shore regions on the eastern border, the western shores of Lake Winnebago and Green Bay, the north central, etc.; while Green County, on the Illinois border,—the home of the Swiss cheese industry of America—has played a very important part in the development of that section of the state. An average of eight farmers represent a cheese factory community. Richland County is another American cheese center of the southwestern part of the state. Dodge County, consisting of twenty-five townships, famous for its brick cheese, manufactured a little over 14,000,000 pounds of cheese in 1909 and passed the 23,000.000 mark in 1915. Five counties located in the north central portion of the state finished in 1909 with 7,724,538 pounds of cheese to their credit, while in 1915, the output was 28,169,062 pounds. In fact all except sixteen counties in the state showed an increase. Eight of these sixteen counties are located in the extreme north and a few of the others in the market milk territory in the southeastern portion.

The creamery industry has played a very important part in the development of the northern portion or the cut-over lands of the state. In the partially settled territory only 2,390,240 pounds of butter was manufactured in 1909 and in 1915, 5,751,555 pounds was made.

A WISCONSIN CREAMERY

This is a clear indication of the place that the dairy cow occupies in the development of the newer regions of the state.

The Market Milk Industry

Regardless of the line of farming that may be followed in any state, the production of market milk, even if it is conducted as a side line, becomes a very important line of agricultural operation. As the cities increase in population the milk producing area must be developed or extended to meet the demands. Milk and cream is a necessity in every home and even at the present price of ten to twelve cents per quart it is classed as an economical food.

Since the cities, villages and hamlets must have a regular milk supply and some dairymen in each of these communities must be called upon to furnish the required amount of milk, the city trade as a market for good milk and cream should at all times offer to the dairymen inducements which are equal or better than those offered by any other market for farm produce.

The manner in which market milk and cream reaches the consumer is dependent in a large measure upon the size of the cities and the development of the industry. In the larger cities of Wisconsin—Milwaukee, having a population of nearly 400,000, as an example—nearly all of the milk is handled by dealers who depend upon dairymen for their supply. These dealers have erected a suitable place for the proper handling of the product until it is delivered to the consumer's home, hotel or restaurants. In other words these dealers act as middlemen or distributors, hence the work performed by the producers is reduced and his income is less per one hundred pounds of milk as compared with what he would receive if he bottled and delivered his own product. When the dairyman sells his output to a dealer he is paid a fixed price per can or one hundred pounds of milk delivered. The actual fat content of the milk may or may not be a determining factor other than that it must be the normal product of the herd. A number of these milk plants are so equipped as to economically handle the surplus, either in the form of butter, ice cream, cottage cheese, etc. A large per cent of the milk handled by these dealers is pasteurized before it is delivered to the consumer and the bottles are sterilized before they are filled.

There is another group of cities where possibly fifty per cent or more of the milk is distributed in the same manner as for the larger cities, while the balance of the milk is delivered to the consumers by dairymen who sell their own product, bottled at the farm.

There are also a large number of villages and cities that do not have a milk plant, hence the milk is delivered largely by dairymen, or a large number of families may obtain their supply of milk from a neighbor who may own one or more so-called "family cows." In a few cases families may obtain their milk from a dairyman who may pass by en route to the creamery or cheese factory.

Producers and Consumers Must Cooperate

In every community there must be cooperation between the producers and the consumers of milk. They must understand each other's problems and at no time should the producers feel that the consumers are over critical. It is natural that they should be watchful and observant of what they are getting. The consumers do not object to paying for good milk and cream a price that will insure a reasonable margin of profit. They have a right to demand that all of the milk used for the city trade be obtained from healthy cows, that these cows be fed abundantly on good, wholesome food, housed in clean, well lighted and well ventilated barns; that the milkers be reasonably clean and that all utensils be thoroughly cleaned after each time they are used; that the milk be properly cared for until it is delivered either to a milk dealer or to the consumer; that his place is always open to inspection by the dealer or consumer of his product.

It is highly important that the consumer shall be considerate of the dairymen or dealers who may furnish the required amount of milk. This means that bills shall be paid promptly and bottles cleaned and returned daily. If, for any reason, there is an unavoidable shortage in the regular supply they should be willing to cut down on the amount used if so requested by the party delivering the milk and to give the milk proper care after it is delivered.

Compare the price of milk, and its food value, with other commodities used in the home. Look upon the dairyman as a person who understands his business, has capital invested, working on a small margin, with long hours and very little chance for a vacation.

That this cooperation exists in this state may be illustrated by the grade of milk and cream that was sold in two hundred and ten cities in 1917. Representatives of the dairy and food department collected 691 samples of milk and 347 samples of cream. The average per cent of fat in the milk was 3.8 with 42.69 per cent of all samples containing from 4.0 to 5.6 per cent butter fat. The average per cent of fat in the cream was 24.1. It is no little credit to the milk producers when milk and cream of such high fat content is sold.

Education Has Been Beneficial

The dairymen owe a great deal to the various educational advantages that have tended to place them on a higher plane of efficiency. The state dairy association for more than forty years has led the way. The farmers' institutes, the dairy and food department, the butter and cheese makers association and the dairy and agricultural press have had an influence on this work.

The agricultural college in its early missionary work did a great deal in pointing the way for higher production, better and more live stock. The three hundred to five hundred young men that each year, for the past decade, have attended the short course in agriculture, have very largely returned to the farms, thus lessening the distance between that center of learning and the farmer.

The county agricultural agents and the representatives of the dairy and food department in their personal visits to the farms have planted the seed that later has resulted in better barns and milk houses and a greater interest in farm life.

The cow testing association has 84 centers of operation and yearly gets in touch personally with more than 2,500 dairymen. This work not only separates the good and the poor cows, but it puts new enthusiasm into the dairymen. The cow that produced 1,250 quarts of milk in thirty-one days is a good producer of human food. She is located on an ordinary Wisconsin farm and she has a right to claim a prominent place in the best dairy barn that was ever built.

Several scores of community meetings in the interest of dairying are annual events in many counties.

A FROSTY WINTER MORNING

A Graduate of Yesterday Speaks of the Girls of Today

Katherine Jensen, '04

"The object of education is preparation for complete living," says Herbert Spencer, and when one speaks of "complete living" in this constructive age one refers to that life which makes the greatest contribution to the future. The most useful person, naturally, is the one who is best prepared, and at the same time most willing to follow the line of industry for which he or she has been peculiarly adapted by nature.

In discussing the successful or useful young woman I do not mean to convey the idea that women must leave home in order to offer a contribution to society. If all of the young women completing their school work were to leave their homes, would home still continue to be the institution that it has been in the past? It is pathetic to find that so many of the young women in the country have become discontented and followed, in the words of one writer, "The funeral procession of the nation cityward." Surely the farm woman has no reason to feel ashamed of the part that she has played in the world of achievement, for it is said that eighty per cent of the names that appear in "Who's Who" represent a bringing up in the country. There are those who have been reared in the city, who have a feeling of pity for those who come from the farmstead. We are glad to know, however, that our city friends who carry this attitude are the narrow minded type, the type who know very little of the world and its achievements, and who probably never have entertained a single constructive thought.

Country women have been made to realize that the welfare and happiness of the human family, rather than the accumulation of more material wealth, is the real end of any business. A woman does not contribute toward this end, whose whole thought is on fashion, the latest coil of the hair, style in dress, handshake, the latest in the modern dance and in the movie world. Country women have learned that the vital problems of life are solved by the woman whose sole thought is the welfare and happiness of the family rather than the welfare and happiness of herself.

We are not surprised to learn that such women as the following have had their early bringing up in the rural atmosphere: Clara Barton, inaugurator of great works of mercy; Frances Willard, great reform leader; Harriet Beecher Stowe, writer of a book that has made her world-famous; Jane Addams, who every day helps extend justice to those who suffer wrongful conditions; and Alice Freeman Palmer, president of a college.

Young women from the country must realize that they are essential for the growth and progress of country life and therefore of national life. Without them the community is deprived of that dynamo which keeps it moving steadily forward. Their career is quite as much to be eagerly sought as that of a writer or artist. It is the purpose that makes life worth while. The problem of the young American country girl must be solved by her country sister. No town woman can solve the country woman's problem. If she is constantly longing and aspiring to leave the farm home there must be a serious reason. Let us ask the question "Is the system designed to foster justice and happiness accomplishing this end for the majority of country girls?" No girl will be content to stay on the farm unless there is opportunity for growth. Every young person has God-given ability and he or she should be given the privilege to fully develop this ability. Growth results in personal happiness and contentment.

If there is to be opportunity for growth for the farm girl there must be leisure time for recreation. There must be the telephone, church, lodge, automobile, club, and lecture. A constant dull succession of duties with no time for growth is not going to attract the energetic woman, who is living for the interesting and beautiful things in life. Professor Fiske says, "The annual conquest of farm difficulties makes great fighting and the challenge of the difficult is what makes strong men and women." A higher degree of intelligence and state of efficiency is required of women than ever before. Let us depart from the ways of the old folks and bring the workshop of woman (the worst in the farm world) up to that standard which the scientific world has made possible.

The change in the industrial and agricultural forces has changed woman's responsibilities. A woman, today, cannot keep house instinctively any more than a man without training can succeed in a chosen profession. The food that a woman buys, her clothes, the furnishings for her home, sources of amusement, and public entertainment all have taken on new forms and fanciful names. Society offers new attractions, some beneficial and some questionable. New responsibilities have arisen in every phase of home life, the nucleus of social life. The administration of a home today calls for women trained in the business.

The state agricultural colleges of the country are especially well fitted to give this training in home making and home administration. Four year courses are offered in the colleges for high school graduates who wish to enter a profession. The training at the same time fits the young woman for home making. For the great majority of girls who never complete even the eighth grade, courses are offered which fit the girl for home life without requiring her to take the technical work necessary for a profession. These courses are arranged for young women who cannot be spared from the farm and home during the busy seasons of the fall and spring and are exclusively practical. The two year course of six months each and a three months winter short course are especially practical. It is an unfortunate circumstance that more girls do not avail themselves of this splendid opportunity of taking a course designed especially for their needs; an opportunity which not only gives practical training in home making but throws the girl in contact with the fellow student and the class teacher,—an education in itself. There is nothing that develops a woman more quickly than to take her out of her old surroundings and throw her into an entirely new environment.

In looking over the records of the North Dakota Agricultural College I have found that there is a marked difference between the number of young men and young women yearly taking the industrial and short courses. Judging from the figures taken from these records I am led to believe that the young men have been more wide awake in availing themselves of the opportunities offered to them. The disproportionate enrollment of young men may also be a result of the greater economic value of the boy as recognized by the parent. The girl's contribution has not been given money value. Surely it cannot be said that the parent is treating the boy more fairly and squarely than he does his daughter. Figures show at the North Dakota Agricultural College in:

Industrial Courses

	Boys	Girls
1911-12	312	36
1912-13	256	49
1913-14	239	44
1913-14	230	27
1915-16	200	18
1916-17	185	19

Short Course

	Boys	Girls
1911-12	244	26
1912-13	426	34
1913-14	314	24
1914-15	254	22
1915-16	369	31
1916-17	214	11

Whenever the daughter has been given equal opportunity with the son she has proven to the satisfaction of her parents that a short course or industrial course is of inestimable value to her. She comes home with a broadened outlook and new viewpoint. Not infrequently her economic value has surpassed that of her brother. May the parents then, as circumstances permit, give the young woman who has been so faithful in the home, so bound up in the welfare of every member of the household, this opportunity for self improvement; this opportunity of preparing herself for a life of greater usefulness and efficiency.

Fixing Dual Type and Character in Red Polled Cattle

Geo. P. Grout, '08

For more than three hundred years the shire of Suffolk, England, has been noted for its rich agricultural lands, for its dairy products and its polled cattle of deep milking heredity.

"East Anglia, the name applied to the Norfolk and Suffolk area, is almost an island. Its cattle were thus, down to the early years of the eighteenth century, less likely to be a mixture of breeds than in most other parts of the kingdom." No early breed had a better reputation for milk production than Suffolks. Early writers describe them as an excellent breed carrying vast substance, and Dickson traces them to the cattle of the 6th century. Cattle which were supposed to be descended from old time farm herds were termed "homebreds."

Suffolk Character

The original Suffolk cattle as known in England early in the eighteenth century were polled, great milkers with large, loose udders, creased when empty, milk veins remarkably large and rising in knotted puffs, with clean cut throat, short legs, springing rib and large carcass; good loin, the hip bones lifting square and even and tail rising high from rump; color, red, yellowish, cream colored or dun. As dairy cattle they served their purpose well, some giving as high as eight imperial gallons of milk per day and whole herds averaging five gallons while on grass. However, to many tenant farmers they were unsatisfactory because the London market demanded a better carcass than could be furnished from the Suffolk cows.

Norfolk Character

Mr. Marshall, writing in 1787 on Rural Economy of Norfolk, gives the following description of Norfolk cattle: "The native cattle of Norfolk are a small, hardy, thriving race, fattening as freely and finishing as highly at three years old as cattle in general do at four or five. I have seen Norfolk spayed heifers sent to Smithfield, as well laid up and full in their points as Galloway or Highland 'Scots' usually are, and if the London butchers be judges of beef, there are no better finished beasts sent to Smithfield market." Record is made of a Norfolk "home bred" slaughtered in 1810, weighing 2,105 pounds. A few of them were also said to be splendid milkers; the favorite color, a blood red.

The Reeves Hybrid

John Reeves, a tenant on Holkham since 1786, was dissatisfied with his Suffolk cows as feeders at Wighton and being well informed by agricultural writers and neighbors of the merits of the Norfolk "homebred" had been impressed with the thought that it might be possible to breed a cow which would be desirable both as a producer of dairy products and also as a dam of a steer which would give good account of itself on the block. John Reeves began his work about the same time Bates and Thomas Booth set about to improve the Shorthorn breed. Marshall had recorded in his early observations that the mating of a Suffolk bull on the native, hardy, thriving cows of Norfolk gave an increase in size and form altho the resulting product did not fatten so readily. With this information John Reeves determined to hybridize the Norfolk and Suffolk cattle. The results of his labors we find by inspecting the records of July 1st, 1808, where we learn he showed a bull of his own breeding at Norfolk Agricultural Society, Swaffhan. The official report of this fair is as follows: Stock shown was not numerous but excellent of its kind. The premiums adjudged were:........................... for the bull (one only being shown) to Mr. J. Reeves of Wighton. This breed is a new kind, partaking of the best qualities of the Suffolk and Devon and the old Norfolk. It has no horns, is of a true Norfolk red, and will get stock that will fatten to about 50 or 60 stone (7 or 8 hundred pounds), with as little coarse meat as can be expected.

From this above report we are warranted in concluding that Reeves' experiment was a success from the first but the fact that others did not undertake this same experiment is abundant evidence that Reeves' success was due to the fact that he was a keen observer and discarded by rigid selection any animals that did not meet his ideal. It is a well established fact that after the year 1873 practically all the stock known as the Norfolk and Suffolk polled carried a large infusion of the Reeves Hybrid. Agricultural societies ignored this breed for years, providing classes for Shorthorns, Herefords, and Devons; and Ayrshires for dairy cattle, but fortunately the council of R. A. S. E. required for the 1862 show, to be held in what is now Battersea Park, London, that the cattle which had in previous years been competitors in the "any other breeds" classes should be exhibited as Norfolk and Suffolk Red Polls. It will thus be seen that the Norfolk and Suffolk cattle, as a breed, have not been recognized more than fifty-five years and even then continuous progress was delayed by the outbreak of the rinderpest in 1886 and 1887. Euren says well bred herds fell victims and but for the selection and transportation to another section in the year 1864, by Benjamin Brown, a small Thursford farmer, there would have been no certainty that any of the Reeves stock yet existed. While we have no absolute proof as to Reeves method of selection it is fair to suppose his success was hastened by the application of what we now know as Mendel's law.

We have his own statement for the fact that his original herd was strong in milk production and was composed of the Suffolk polled cattle upon which he used a Norfolk cross. Since the dams of his original hybrids were producers at the pail, we have every reason to believe that the same law applied then as now; that is, the daughters of a bull inherit the milking qualities of the sire's dam, and as deep fleshing quality is always visible to the eye, a selection of the Reeves hybrid proved satisfactory in the use of other herds and thus his cattle sprung into popularity as a breed having dual character. Having founded a breed with the high producers of the Suffolk Red Polls, we find very early in the history of the breed that milk records were kept. From 1891, three years later, after the Red Polled Society was formed, the directors of the Red Polled Association recognized the importance of inherited milk production of the dam of a prospective herd bull, printed the milk records with no charge to the herd owner, likewise the live weights of the fatted steers and heifers and continued to do so until 1907. We have the information that 2,150 yearly records of milk production have been published since May 1st, 1886. It is of interest to know that the Live Stock Journal of London published annually from May, 1887, milk records of whole Red Polled herds and the same year a circular was prepared by Mr. Euren for Mr. Garret Taylor, setting forth the annual records of the entire Red Polled herd at Whitlingham. It will thus be seen that the first authentic yearly records were made with Red Polled cattle, as not until 1895 were records begun in Jutland or Denmark.

History tells us that they were begun in Holland and Sweden in 1897.

In the year 1895 in England there were Red Polled milk records of 13 whole herds, all well authenticated and published. 126 of these cows were in the Whitlingham herd. It was in this herd that the process of weeding out was carried on to its fullest extent. Here the foundations blended together and hybridized as in a melting pot; were tested for milk by the means of the scales and later the Babcock test, and the deep fleshing qualities retained thru the common practice of showing at public livestock shows. Let us say that it is not fair to give John Reeves all the credit for improvement made in the breed up to this time as he had aid from such noted men as the Hudsons, G. B. George, and Richard England, nor is it fair to credit all the splendid work of sifting out the non-producers to the Whitlingham herd, for there were many others who co-operated in the early work of testing, and as early as 1880 R. Harvey Mason of the Necton Hall estate began the work.

Mr. A. J. Smith started a Red Polled herd at Rendelsham selecting 21 cows of the B. group and systematically tested his herd for milk production beginning in Sept. 1889.

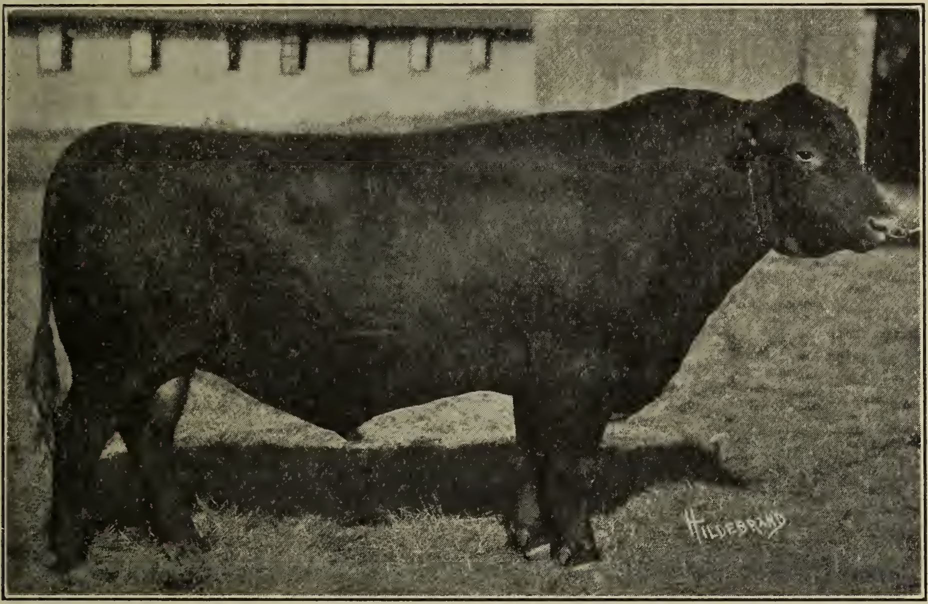
Lord Heytesbury was another advocate of record making and John Hammond who brought out the H1 and the H2 families made many of the records among the Davys. Among others who kept complete milk records of all the animals in their herds were: T. C. Blowfield, Hoveton herd; the R. Honorable Lord Hastings of the Melton herd; C. F. Newtons, Saham Toney herd; Hon. W. F. F. Smith, M. P., Thurlow Hall Farm; Lord Rothschild's Ering Park herd; Earl of Radnor, Langford Castle herd.

From the above herds, all of which were annually tested for milk production, the early importation of Red Polled cattle was selected, giving the imported Red Polls the much deserved title of the "Dual Purpose Breed."

To return to the subject of blending dual character, one of the bulls in which the results of hybridization can be most clearly seen is in the Suffolk Baronet. His dam carried eighty per cent Suffolk blood and his sire was a strongly bred Norfolk bull. As a sire the Suffolk Baronet got two daughters, with average yearly records better than 9,000 pounds of milk and one with a record better than 7,000 pounds milk, yet to the outward appearance he took on the type of the Norfolk beef stock. Later where the hybridization had been carried further, we find in the great bull, Corporal, about 53 per cent Norfolk only 6 per cent Suffolk and about 40 per cent of the Reeves hybrid. This bull with his full brother, Crown Diamond, was selected not only for milk production but because they inherited the dual type. To be sure, their first and second dams averaged 10,473 pounds milk in a year, and Corporal, when he came to be used as a sire, got five A. R. cows, four with records above 400 pounds fat. Crown Diamond, Corporal's full brother, was Champion of England for several years in the show ring, and having the same dams, the average of the first two was likewise 10,473 pounds milk. As a sire he got one cow with a record better than 10,000 pounds of milk in one year, another that averaged over 9,000 pounds two consecutive years, and still a third that averaged 9,000 for nine consecutive years. If we understand Red Polls correctly, Crown Diamond was the greatest Red Polled bull ever owned in England and his full brother left the greatest imprint for dual character of any Red Poll ever imported. Carrying selection and constructive breeding one point further, we find when Corporal was mated with Red Polled stock of dual character, he produced a son, Proctor Knott, whose first four dams average 9,000 pounds milk and Proctor Knott, when mated with the proper females sired seventeen daughters and three grand daughters whose average production is 442 pounds fat official, making him leading A. R. sire of the breed.

It is an interesting fact that even in a breed having dual character many of the greatest sires were out of tested dams. Among those that contributed largely to the early history of the breed we find twelve that are out of a dam ranging from 8,000 to 11,000 pounds milk in a year. Of other great sires not out of tested dams, it is of interest to note that fourteen more were strong in the blood of Wild Rose of Kilburn. Some were sons while others were line bred to the blood of this great cow. In the early history of the breed, there are seventy-seven records made in England by descendants of the Wild Rose of Kilburn and these records average 8,642 pounds milk. While this cow lived before the days of yearly records, she was not only a great prize winner in the show ring but had the reputation of averaging 9 pounds of butter per week the year around. By the same sire and bred the same on dam's side was No. 1,523 Floss II, who milked up to 70 lbs. on grass. As a further tribute to the blood of this great pair, it is a singular fact that practically every high producing cow in the Jean Du Luth Herd, with the exception of old Pear, carries the blood of the "Wild Roses." All the Jean Du Luth herd with the exception of old Pear carries the blood of the "Hill Roses." All the world's records are held in this herd and the ten highest cows of the breed are owned here and have been developed on the farm. Jean Du Luth Beauty, whose record in 20,280 pounds milk or 891 pounds fat equal to 1,114 pounds butter, is line bred to this blood thru her dam and is sired by the bull, Proctor Knott, leading A. R. sire of the breed. This bull was recently developed on Jean Du Luth farm.

By the application of Mendel's law, altho it may not have been known as such at the time, and thru the selection of animals having the desired characters, the production



32 TIMES GRAND CHAMPION

of the old Suffolk Polls has come down to the present day with the type and the color of the Norfolk "Homebred" and to these characters are now added increased percentage of fat, a greater milk flow and increased size of carcass until the present World's champion weighed 1,750 in milking form, carried beef enough to be acceptable on the block and averaged 4.3 per cent fat in her milk, with a milk record of 20,280 pounds. She is a deep cherry red and transmits these characteristics to her offspring. She is line bred to the Duke of Norfolk and traces ninety six times to this sire, and she is also line bred to "Wild Rose" blood.

North Dakota Demonstration Farms

W. R. Porter, '06

The twenty-one North Dakota demonstration farms are located in the different parts of the state so that they are under the different soil and climatic conditions. Each farm is made up of five to ten 4-acre fields, on which a rotation of crops is produced and one or two fields may be given up to alfalfa or some other crop that is being tried out, as sweet clover. The demonstration farms are a part of some farm and they are operated by the farmer, the work being done with his ordinary farm equipment. The management of these farms is in the hands of the director of the experiment station and the superintendent of demonstration farms.

During the season of 1917, twenty-one demonstration farms were in operation, located as follows: Bathgate, Beach, Carrington, Dawson, Granville, Hazelton, Hoople, Jamestown, Larimore, Lakota, McLeod, Mohall, New Salem, Oakes, Portland Jc., Park River, Rugby, Sanborn, Tioga, Washburn, and Wahpeton.

The first demonstration farms were started in the spring of 1906. Three of these farms are still in operation, viz.: Granville, New Salem and Beach. They have therefore completed twelve years. Four have been in operation for eleven years. These are at Bathgate, Carrington, Larimore and Sanborn. 1917 was the ninth year for the farms at Hazelton, Hoople, Jamestown, McLeod, Rugby, Washburn and Wahpeton, and the eighth year for the farms at Mohall, Oakes and Dawson; the sixth year for the farm at Lakota, and the fifth year for the farm at Park River; and the second year for the farm at Tioga. A new farm was located at Mott, to be put in operation the coming spring.

The Objects of Conducting the Demonstration Farms

These farms were primarily started to show what good seed, good tillage methods and good rotations would do in the different parts of the state of North Dakota. The first rotations planned were of but five or six years and their object was to increase the wheat production per acre as much as possible. In this, these farms have been very successful. During the entire period of eleven years, 1906 to 1916 inclusive, the wheat yield on these has been 58 per cent greater than the average of the state. The second object in starting these farms was to introduce and spread information in regard to new and special crops like alfalfa and sweet clover. Twelve years ago it was generally believed that alfalfa could not be grown successfully in our climate. Farmers had tried it and experiment stations had tried it to a greater or less extent and it nearly always winter-killed. It was just prior to this time that the Grimm alfalfa was found in Minnesota and the early trials showed it to be perfectly hardy. This was seeded on the demonstration farms quite generally, early in their existence. The experiment station has securd a great deal of information in regard to the ability of Grimm alfalfa to withstand the winter, and these farms have apparently been chiefly instrumental in increasing the acreage of alfalfa in North Dakota. The county agents, when they first came to North Dakota, looked to the results obtained on the demonstration farms for the best methods of growing alfalfa. The knowledge obtained from 1906 to 1912 caused these men to have full confidence that alfalfa was one of our best farm crops, and this enabled them to convince farmers that they should greatly increase their alfalfa acreage. Not only was our Grimm alfalfa shown to be our most dependable alfalfa, but large amounts of the Black Hills alfalfa from South Dakota had been planted on those farms. The experience of the Mohall farm is typical of the results obtained from this alfalfa. In the spring of 1912 sixteen acres of Grimm alfalfa was put in. This field has produced well ever since that time. In 1914, a field of South Dakota alfalfa was seeded on this farm. It yielded 2,000 pounds of hay per acre in 1915 and 5,920 pounds of hay per acre in 1916. In the spring of 1917 the Grimm field was all alive and vigorous, but the Black Hills alfalfa was all winter-killed. We had a similar experience at Sanborn the previous winter.

Medium red clover was included in practically all the rotations when the demonstration farms were first started. Very few successful crops of this veriety of the legumes were produced west of the Red River Valley. These farms have demonstrated that medium red clover is not adapted to regions west of the Red River Valley in North Dakota, owing to our severe winters and dry hot summers.

Sweet clover, on the other hand, is a new crop and is being tried out on several of these farms. It seems to be entirely hardy, can be started without difficulty with a nurse crop, it furnishes a large amount of excellent pasturage and can be used for hay if cut at the proper time and properly cured.

Winter Wheat Tests

In 1908 and 1909, the farmers of North Dakota began to think that the growing of winter wheat might be very profitable. Between 1909 and 1914, eighty different fields of winter wheat were sown on the demonstration farms. Some was seeded in stubble, some was seeded in summer tilled land and some was seeded in corn. During this period but twenty of these fields were cut and half of these were probably not as profitable as spring wheat would have been, due to winter injury. These tests show rather conclusively that winter wheat, unless we get hardier strains than those now known, cannot be recommended for planting in North Dakota.

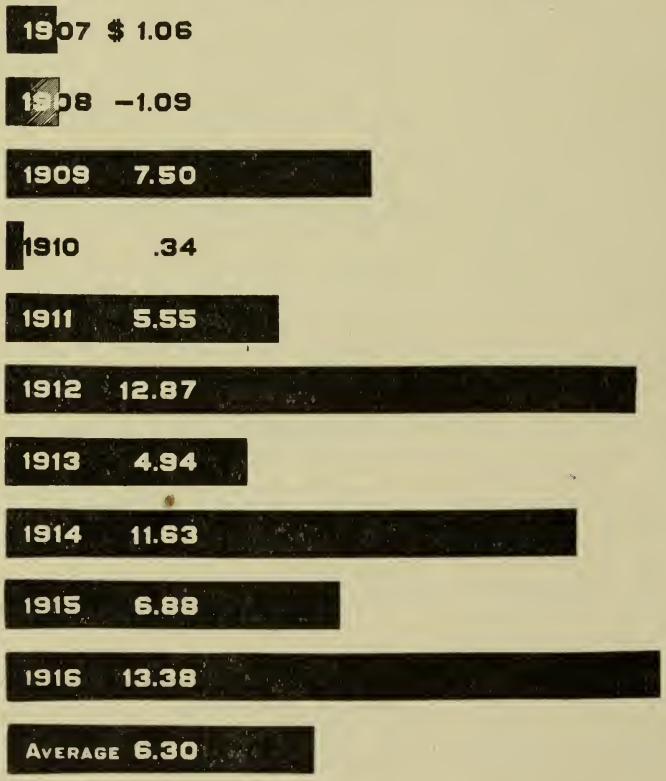
These are examples of how the demonstration farms have been used to try out crops or methods under the different conditions that prevail in the state, cheaply and quickly and under actual farm conditions. In this way accurate information is secured in a comparatively short time, and is made available to the farmer so that he can incorporate it in his farm practice.

These farms are also used to get definite relative costs of raising the different farm crops. A daily report is made by each manager of the demonstration farms as to the amount of labor done and the time it required. By using the figures obtained at Halstad, Minnesota, for labor, machinery depreciation and horses' cost, the cost of producing different crops on the different demonstration farms has been figured.

Each year large quantities of improved seed, such as North Dakota No. 52 Wilt Resistance Flax, Marquis Wheat, North Dakota No. 871

Barley, North Dakota No. 778 Arnautka Wheat and Grimm Alfalfa seed have been grown on these farms. In many cases, neighbors come to the threshing machine and get their seed grain direct from the threshing spout. In this way these farms become a center of distribution of good seed to the neighbors.

10 YEARS AVERAGE NET PROFIT PER ACRE ON THE CARRINGTON DEMONSTRATION FARM 1907 1916 INC. 60 FIELDS.



AVERAGE YEARLY INCREASE IN LAND VALUES $1.50

What grain is not sold in this manner, if of good quality for seed, is cleaned up and sold directly by the experiment station director to farmers in various parts of the state and considerable seed has been sold outside of the state.

Probably one of the most valuable things the demonstration farms have accomplished is to show that crop rotations are profitable in North Dakota. North Dakota, however, requires a very different system of crop rotations from that practiced in the corn belt. The corn belt of the United States has the shortest crop rotations used in any part of the world. It is usually as follows: Corn followed by oats or winter wheat, which is followed by clover. This rotation is lengthened somewhat by growing more corn, but in three crops it contains essential crops for a crop rotation, viz., a cultivated crop, some grain crop and a legume grass crop. In the northern part of Europe the crop rotations are longer, usually from eight to fifteen years. North Dakota, to be most successful in crop rotations, will have to adopt a long crop rotation. Five or six years is altogether too short, but such rotations are a step in the right direction. The farm at Tioga has a seven year crop rotation and the one at Mott will have a ten year rotation.

As far as we can see now, an ideal crop rotation for North Dakota would be as follows:

Corn
Wheat, sweet clover and timothy or western rye grass
Sweet clover and timothy or rye grass pasture
Sweet clover and timothy or rye grass hay
Potatoes
Wheat
Oats or barley
Winter rye
Flax.

Besides this regular rotation as above, which would require nine equal fields of cultivated land each year, another field should be in alfalfa for a period of nine or ten years. When this period is over, the alfalfa fields should be broken up and put in the rotation and a new field should be sown to alfalfa. For the study of systematic crop rotations under average farm conditions, the demonstration farms of North Dakota will give us more valuable information as time goes by. Perhaps one of the most valuable things that these farms have shown to date is the fact that the wheat crop increases very materially under a system of crop rotations. For instance—the oldest farms in the western part of North Dakota, viz.: Beach, New Salem and Granville have an average yield of 20.75 bushels of wheat per acre (10th annual demonstration farm report, page 68) for the first ten years of the crop rotation. The four eastern farms, viz.: Bathgate, Carrington, Larimore and Sanborn, have a yield of 18.82 bushels per acre or 1.93 bushels in favor of the western farms for the ten year period. The eastern farms started a year later, but the difference in season is not sufficient to account for the larger yield. The important fact brought out is that the western part of North Dakota will produce as much or more wheat per acre on the average as the eastern part of the state. In poor years the yield in western North Dakota will be lower, but in the good years it is much higher and the average has been as high or higher than in the eastern part of North Dakota. The three oldest farms during their first ten years showed a wheat yield of 74 per cent above the average of the state for the ten year period, and the four farms in the eastern part of the state showed an increase for the same period of 68 per cent. As these rotations continue and the land gradually builds up, this percentage will tend to increase, particularly when compared with land which is kept in small grain continuously, as too much of North Dakota is still farmed.

Genetics Old and New

L. R. Waldron, '99

Certain theories regarding heredity have existed since ancient times. Many of these theories have been handed down even to the present day. It is hardly necessary to say that these ancient theories do not have a scientific basis, in the proper sense of the term. It is likely that they were all derived from observation was evidently faulty. A few of them hold a modicum of truth while other beliefs have since been found to be quite erroneous. But interesting, and sometimes valuable as these old theories are, one is quite safe in saying that until the time of Darwin the science of gentics or heredity was a closed book. Practical breeding was of course carried on for it is well known that the science and art of breeding need not go hand in hand.

Second Period

In his classical work, Darwin opened the way for new ideas in genetics, altho in the post-Darwinian period we find comparatively little scientific work done in this field. True there was much speculation but the investigations were mainly in morphology, embryology, physiology and the like. Perhaps it was thought that the mine which Darwin had opened contained all the genetical science which could be assimilated for long years to come. Certainly the practical breeders were evidently satisfied and those who might have been investigators, with one rare and remarkable exception, were seemingly satisfied with polemics. Aside from one piece of brilliant work bordering on genetics, Darwin's time was spent mainly in following out his evolutionary thesis.

Obviously then we will be able to gain as good an insight of genetics if our ideas are taken from the best practical breders as could be furnished by the theoretical writers. What were the current ideas regarding heredity previous to say 1900 and indeed still extending in part to our own day? Only a few can be mentioned.

Among the generality of people who had ideas upon the subject it was believed that organisms exhibited but one kind of variation. Organisms of a certain type,—of height or color or what not, would produce offspring of the type of the parent but showing variation in their turn. It was held that there were two "forces" in operation: a centrifugally acting force of variation and a centripetally acting force of heredity.

The practical application of the above would be that the type of an organism could be changed at will depending merely upon the selection as parents of certain offspring having the characters desired. Owing to a certain amount of "regression," selection thru one generation might need to be continued thru succeeding generations. Eventually the goal would be reached.

Belief in the so-called inheritance of acquired characters was almost universal until the nineties, when Weismann openly challenged the evidence. As practically no good positive evidence existed, the idea has fallen into disrepute.

In regard to crosses, the individual was regarded as the unit. The whole attitude relative to heredity in hybrids was so different in many ways than the present one that it is only with difficulty that we are able to view the subject from the old standpoint. Let me quote a few statements of the older geneticists, and those of the better class, relating to hybridization.

"In the hybrid there has been created a power for greater yield."

"A 'reaction' has been produced."

"Thru the mixture of 'blood' (speaking of plants) the centrifugal force (of variation) has found a new place to center its efforts against the centripetal forces of heredity."

One may be sure that when a science has reached such a stage of metaphysics and mysticism, theory is not going to be of much value to practice. The quotations above were written at about the time of the rediscovery of Mendel's law. What a wonderful change!

In surveying the older field of genetics one is impressed with the fact that so far as the ideas of variation and selection were concerned they were limited by clear-cut theories. The status of these theories may have changed at the present day but the point is, the theories were well defined. In regard to hybrids, the case was different. Here the facts were too numerous and too diverse in character for them to be brought under cover of any well defined theory, because of the observational rather than the experimental methods of research then in vogue. It is then obviously impossible to express in a few set phrases a general scheme showing the older theories of the workings of hybridization. In order to obtain a notion of the then current ideas it is necessary for the reader to turn to the contemporary articles of the time.

The Modern Period

The modern period dates from about 1900, when Mendel's law, so strangely hidden for so many years, came to light. Weismann and others had opened new vistas to us earlier than that and some epoch-making contributions came to us later.

What were the most productive ideas that came to light in the earlier years of this modern period?

Not taking them historically let us mention first the demonstration, let us call it, that there were two kinds of groups of variation of first importance. This idea was really old but it took the combined genius of Weismann and de Vries to make it living and dynamic.

Weismann's contribution to the establishment of this idea was indirect but important. He showed clearly that sexual organisms are dual entities. Each is composed of its soma-plasm and of its germ-plasm. The soma-plasm or "soma" for short, is the organism as we know it. It comes from the fertilized egg, becomes adult and finally dies. The germ-plasm is that portion from which the soma arises. It is found in the ripe eggs and in the ripe sperm and in the preceding generations of those eggs and sperm. It is carried on from generation to generation and to all intents and purposes is immortal. It is not necessary to be in any ways mystical about the germ-plasm for very recent research has shown pretty conclusively that the germ-plasm essentially constitutes the chromosomes of the nuclei of the eggs and sperm.

Now relative to the two classes of variation, they may be designated as fluctuating and single. The fluctuating variations affect the "soma" and are not inherited or at any rate in the proper sense of the term. The single variations affect the germ-plasm and are inherited. It is not known that influence upon the "soma" will affect the germ-plasm, at least within the compass of several or even of many generations. The foregoing ideas clarified the atmosphere in a wonderful manner and instituted law and order where before was much chaos and confusion. Previously all discussion relative to heredity was on the basis of the soma (unconsciously to be sure). Today, questions of heredity are mostly on the basis of the germ-plasm. What could better exemplify the great change which has come about than this almost complete reversal?

Another conception which became dynamic a little later than 1900 was a realization of the varying nature of the organism in regard to its hybrid condition. An organism may be pure bred or hybrid for a certain character or for a number of characters in the case of certain self-fertilizing plants it would be possible to conceive them as normally pure bred for all their characters. On the other hand the fertilized egg may carry a contrasting pair of factors for any character or for many characters in which case the resulting organism is said to be hybrid for the characters involved. For instance a plant may carry in its germ-plasm the two factors red and white, for flower color. But the mature egg or the mature sperm is always pure for these factors. A ripe egg can carry red or white only, not both.

Hybridization Does Not Cause Variation

If a plant, impure or hybrid for certain of its character, produces offsprings in sufficient numbers by self-fertilization it is evident that the entire gamut of characters made possible by the factors of the germ-plasm will be exhibited in the offspring. The offspring are the spread-out leaves of what, in the hybrid parent, was a closed book with only the title page showing Now the self-fertilization of a hybrid plant is the same process exactly as the hybridization of two individuals, either plant or animal. If in the first case we have an unfolding of what is already present, the same can be said of the second case, when two individuals are involved. It is evident then that variation is not ''caused'' by hybridization. One might say the variability potentially present in the parent is differentially exhibited in the ''somas'' of the offspring, but scarcely more than that.

Effect of Selection

The term ''selection'' has been terribly abused and it might be well to avoid its use. As already intimated, if an organism is pure bred, selection (of the fluctuating variations) avails nothing. Differences of the soma caused, say, by a variable environment are not passed into the germ-plasm. The two plasms seem to act quite independently. The above fact was simply but brilliantly demonstrated by Johannsen in 1903. A little thought must make it clear what a powerful influence such a demonstration must have had in the field of genetics.

Selection within the limits of a hybrid organism does the following: It eventually brings that organism to the surface bearing the characters for which ''selection'' was made, provided such a result is physiologically possible. This exactly parallels the events which take place in a self-fertilized hybrid organism producing offspring sufficient in number to exhibit the entire range of characters potentially existent within the parent germ-plasm. In other words ''selection'' within the limits of a hybrid line consists merely of a germinal sorting of the elements already present. It is not creative in any way. It is in no sense a ''force'' as once considered.

The above discussion includes indirectly the essential parts of Mendel's law; the purity of the matured germs (eggs and sperm) and the rearrangement independently (except in cases of linkage) of the factors which they bear, allowing recombinations of characters carried by the offspring into definite ratios. When germinal variations set in, as they do occasionally, then they become inherited in the same manner as the other factors of the germ-plasm.

The foregoing survey is very brief. The ideas, true of all scientific ideas are not final; they are subject to revision. However they are a vast improvement upon the older ideas for they explain the newer facts better than the older theories could possibly do or explain them where the older theories explained not at all.

Machines for the Household

Levi Thomas, '09

This article deals neither with domestic science or domestic art, nor is it a discourse on household mechanics. It is merely a "pipe dream" by a non-smoker on conservation of human energy and the saving of time. Every household has one or more workshops, and from time immemorial the equipment of these shops has consisted of needles, pins and pots and pans, while the sole source of power and lubrication was elbow grease.

Some one has called this the "age of machinery" and while it may be just as well be called the " age of a great many other things," still the almost universal use of machinery is an outstanding characteristic of modern life. Nevertheless there is one place where the conquest of machinery is far from complete, and that is the household. There are three workshops in nearly every household and in only one of them is there a first class machine in anything like general use. This is in the sewing room. The sewing machine has been practically standardized, can be had for a reasonable price and when equipped with a motor would be hard to improve upon. The other work shops are the laundry and the kitchen. Machines, such as the motor-propelled washers and ironers are now available for the laundry. While some of these machines on the market are very good, the cost seems to be greater than necessary. Were they standardized and put on the market in greater quantities they could undoubtedly be brought within the reach of the average householder.

The kitchen, in spite of the fact that it is under modern conditions used for the most varied and important work of the home, has many tools but practically no real labor-saving machinery. A few small unstandardized machines such as a meat grinder or a coffee mill may be mentioned but all depend upon hand power, and some of them are so inefficient that they are neither labor or time savers. This explains why this dream centers around the kitchen.

The basis of this dream is a picture in a catalog of a factory making equipment for restaurants and commercial bakeries. This picture was of a general purpose machine for bakeries and large sized kitchens. It was equipped so that it could do better than can be done by hand almost any laborious job of the kitchen except dish washing. Below is a partial list of equipment of this motor driven general purpose machine:

1. Batter beater
2. Egg whips
3. Sponge beater
4. Vegetable masher
5. Dough hook
6. Roller beaters
7. Brush beaters
8. Sieves and sieve bowls
9. Water bath
10. Bowls of different sizes
11. Coffee mill
12. Vegetable slicer
13. Food grinder
14. Meat grinder
15 Vegetable parer
16. Knife sharpener

Why could not such a machine be built for use in the small kitchen? Not a cheap flimsy imitation of it but a first class reliable machine built smaller and adapted to the needs of the household. It goes without saying that it would be useful, and below are a few things that it might do to save time and labor on a busy morning:

1. Mix all doughs, batter and sponges.

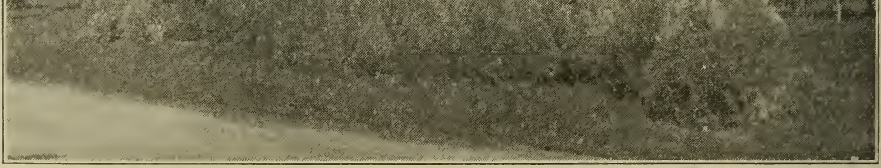
2. Whip eggs, cream, icings, and dressings.
3. Mash potatoes, other vegetables, and fruits.
4. Sieve soups, fruits, etc.
5. Clean, scrape, polish and scour.
6. Grind or slice meats and vegetables.
7. Freeze ice cream or sherbets.
8. Sharpen knives.
9. Operate a fan to keep the "cook" cool when not otherwise needed.

It is not necessary to elaborate further but we will pass on to another phase of the dream. This concerns the International Household Machinery Company of America, which is to be organized in 1930 A. D. By that time the general purpose kitchen machine is a realized fact, as is also a number of other appliances, such as a dish-washer that really works. This International Household Machinery Company was brought into being to satisfy an insistent demand. It is a trust organized with the full approval of the United States congress by a bill forced through it by twenty million women voters, most of whom were stockholders and all of whom were interested. The purpose of the company is the manufacture of standardized household machinery at a reasonable price, which will by that time have come to be considered a necessity in every home.

In that day the man who wrote a rhyme ending, "Women's work is never done" will be considered a "back number." Here is a partial list of the machines that this company will furnish to every household in complete units for less than half the price of a Ford car or a piano player in the year 1930 A. D.

1. Sewing machine with motor.
2. Vacuum cleaning equipment, complete.
3. Washing and ironing machine, motor driven.
4. General purpose kitchen machine, with full equipment and motor driven.
5. Dish washer, motor driven.

Just then I woke up and my wife asked me to wipe the dishes.



Student Government

Alfred Sorenson, '18

In the past few years there has been a noteworthy change in the government of the student body at the Agricultural College. A new constitution was drawn up and adopted in the year 1915, changing the form of government from council to the commission form, and granting all the governmental powers possessed by the student body to the student commission. This has been a very important change in regard to both the scope of power and efficiency of the student government.

The commission is composed of nine commissioners with varying duties and powers. They are in brief, as follows:

1. President of the commission, who shall have the power to call all meetings and preside at same. He shall represent the student body at all public functions and shall outline the policies which shall command the attention of the commission the ensuing year.

2. Commissioner of Public Speaking, who shall be chairman of the Board of Public Speaking Control and shall be responsible to the commission for all public programs of which that board has control.

3. Commissioner of Publications, who shall have charge of the publication of thirty-two issues of the "Weekly Spectrum" and shall be responsible to the commission for the financial as well as all other policies of the paper.

4. Commissioner of Judiciary, who shall act as president of the student court and shall be responsible for the execution of all orders of the Commission.

5. Commissioner of Athletics, who shall be a member of the Athletic Board of Control and shall be responsible to the commission for the execution of all orders regarding the athletics of the student body.

6. Commissioner of Campus, who shall be a member of the Board of Hospital Control and shall be responsible to the commission for the execution of all orders regarding the disbursements of the hospital fund.

7. Commissioner of Social Affairs, who shall have charge of all college parties not given by an individual, faculty or organization and shall be responsible to the commission for the same.

8. Commissioner of Elections, who shall act as secretary of the commission and shall have charge of all the student elections.

9. Commissioner of Finance, who shall be the treasurer of the Commission and be a member of the auditing committee for student finances.

For the future you might say there are three general points or policies which should claim the attention of the commission. They are:

1. To increase the efficiency of the present system and make all desirable and necessary changes in its powers.

2. To increase the spirit and interest of the student body in all student affairs.

3. To strive for an alumnus and student representatives at all faculty meetings when any action regarding student affairs is contemplated. It seems as tho this would be of real value not only to the students but also to the faculty because the more viewpoints that are brought up on any one question the more perfectly can it be analyzed.

ROLL OF HONOR

North Dakota Agricultural College
College Alumni

As is expected the alumni of the Agricultural College are "doing their bit" in the service of Uncle Sam in these war times. It is only natural that this should be, not only because of the patriotism of the former students but also because of the fact that the North Dakota Agricultural College is one of the land-grant colleges, making the students indebted to the federal government to a large degree for their education. Therefore, it is the duty of every student and Alumnus, whenever the opportunity arises, to do all in his power to bring to a successful conclusion whatever the nation is striving toward.

Just now the all important question is "Can we win this war?" No, that is not the right wording of the question, for we WILL win the war. It is "What can I do to help win the war?" This is the question confronting the young man and woman and especially the alumni of the various higher institutions of learning.

As soon as war was declared and the call came for men—and women, too—who would give up, for the time being, the various callings they were pursuing and devote their energies to the successful prosecution of the war, "to make the world safe for democracy," there came a response from thousands of young men and women all over the country. And those who had received their degrees at the hands of the North Dakota Agricultural College were not among the last to respond. The call came first for men who had had some previous training in military tactics that they might be enrolled and trained further to instruct those vast numbers who had never heard nor learned to understand the command "Fall in" or "Right shoulder arms", but who would eagerly respond to the call for men who would carry the American arms where they were most needed. At once came the response and many A. C. alumni dropped their other duties and made application for admittance to the various officers' training camps. Upon the completion of this work the received commissions in the reserve officers' corps and were detailed to the various cantonments to instruct the men who soon began to arrive. This was true not only of the first training camps, but also of the second and now several are ready to go, or have gone to the third camp, which opens the early part of this month.

There was a conviction in some of the towns of the state that they could and should have a company in the North Dakota national guard. So the Second North Dakota was organized and in many instances it was to former A. C. men to whom they came for assistance and guidance in the organizing of these companies.

Uncle Sam sent out a call for men who had been trained as engineers. A. C. alumni heard and responded. The government wanted men who were familiar with wireless telegraphy and some alumni took up this line of work. There was a need for men as mechanics, and as Y. M. C. A. secretaries in the various war camps, and a call for nurses. Former A. C. students are actively at work in all these branches of the service.

In all there are twenty-nine alumni of the North Dakota Agricultural College who are now in active service or training for service. They have entered nearly every branch of the service and are literally scattered all over the world. In looking over the list of those in service we find that the class of '09 is the first to have members represented in the American army. All the classes since then have some of their members in service with the exception of the class of 1913, for so far as we can learn there are none of that class who have taken up active war work as yet.

John Magill, '09, who was a farmer at Verona before the call to war came, is now a mechanic with the 161st Washington Infantry, national guard.

Victor Parker, also '09, had charge of the Technical Department of the Buick Motor Company's plant at Flint, Mich., but now has given that up to enter the special motor service of Uncle Sam.

Thomas Lough, '10, who since graduation has been working as a civil enginerr, entered the service as a reserve engineer. He left recently for the training camp at Petersburg, Va.

The last word received from Scott Drummond, '11, was that he was bound for France with the 25th Engineers.

Max Harrington, also of the class of 1911, is serving his country in the 302nd Massachusetts Infantry. He has the rank of corporal now but it is a safe wager that he will climb higher in a short time.

Of the class of 1912, Ralph Baird is at Jefferson Barracks, Missouri.

Clarence Waldron, '12, is a member of the coast artillery at Cape Fear. He is stationed at Fort Caswell, N. C., and holds the rank of corporal.

C. Leslie Wheeler, '14, left the state as captain of the New Rockford company of the Second North Dakota. When that regiment was broken up Les and his company became a part of the 168th Engineers and is now "somewhere in France."

It's Lieutenant Pearson now, for Bob took the training in the second officers' training camp at Fort Snelling and came out with a commission. He went from there to Kelly Field in Texas, where he stayed for only a short time. Shortly before Christmas he was transferred to Camp Hancock, Augusta, Georgia. He will assist in training men for the signal service of the aviation division. He will probably soon start on the journey across, as his orders read, "Prepare for oversea duty at once."

Lieutenant Curtis H. Pollock, also of '14, was last heard from in Hoboken, "on his way to France".

Gordon Stumpf is to be found with the ordnance repair department at Chickamauga, Ga.

Ruby Hicks, '08, is the only A. C. alumna who is in active service so far as is known. She is now a Red Cross nurse and is helping to sooth the wounds of the soldiers.

Ralph Caulkins, '15, is also a second lieutenant as a result of having taken the training at Snelling. ''Shorty'' is now in the sunny Southland being stationed at an aviation camp in Georgia.

Reginald Colley, '15, is another alumnus in France. ''Reg'' was elected captain of Company B of the First North Dakota when former Captain Anderson entered the regular army. The First North Dakota, after spending a few weeks at Camp Green, N. C., and on Long Island, has sailed for France and according to press reports has landed in safety.

Royal Drummond, '15, has continued in military life since leaving school. He was until recently commandant at the Kearney Military School but has joined the officers' reserve which is now stationed at Camp Dodge.

Carl Paine, '15, has just left for Battle Creek, Michigan, where he will enter the third officers' training camp, so it will soon be Lieut. Paine of the officers' reserve.

Harold Bachman, '16—in France. Harold organized and trained the regimental band of the Smashing Second and took them to Camp Greene. When the ''Smashing Second was smashed'' as one of the daily papers expressed it, this band was selected as the headquarters' band at the 116th Engineers, which indicates the standing of Harold and his band. The band has now covered the various stages of the journey to France and according to reports has succeeded in evading the watchful German subs. Harold will soon be showing the French how the Star Spangled Banner sounds when played by a North Dakota band and undoubtedly soon will be playing the Marseillais as well as any French band.

Ward Porter—Lieut. Porter, '16, was one of the first to try for the first officers' training camp and made it. Now he is Lieut. Porter of cavalry and is stationed at San Diego, Cal.

Raymond Powell, '16, is at Camp Dodge, Ia. He is acting sergeant of Battery B.

Lieut. Curran Rourke is with the quartermaster's corps. ''Rookie'' is stationed at Jacksonville, Fla.

T. W. Thordarson took the training at the second camp at Snelling, receiving a lieutenant's commission, and will be at Camp Dodge to greet those who are soon to be sent there for training.

Several of the class of 1917 took training and are now in the service. Walter C. Bender was graduated from the first training camp at Fort Snelling and is now stationed with the ordnance department at Springfield, Mass. ''Chief'' now responds to the title of first lieutenant.

Stephen K. Bjornson, '17, is assisting the quartermaster's corps in finding fodder for the horses and mules. He is sergeant in the quartermaster's corps and is stationed at Camp Grant, Rockford, Ill.

Andrew Challey left with the hospital company of the First North Dakota and landed at Deming, New Mexico. From the latest reports he is chief cook for the company, so we are sure that the boys are getting good "grub".

Herman Halland, '17, was a midshipman at Annapolis. He now holds the rank of ensign and has been assigned to the destroyer Dolphin.

Sidney Hooper, '17, has been accepted as a candidate for the third training camp and has left for Battle Creek. Sid will make a good officer because he will be able to get along well with the men.

Robert T. Jacobson, '17, is a reserve officer with the signal corps and is stationed at present at Fort Omaha.

William W. Mendenhall, '17, left last spring for the orient. He went out as a representative of the Y. M. C. A. and was sent to Khyber Pass, India. He expects to be sent soon into Mesapotamia where he will be associated with some of the prisoners of war camps and will assist in keeping up the spirits of the prisoners.

Henry Stafseth, '15, is at present in the service of our uncle at Camp Custer, Michigan.

Clarence Waldron, '12, gave up his work with the state of N. C. to join the coast artillery. At the present time he is located at Fort Caswell, North Carolina.

Doing an essential work, for the socialization of army life, are Clarence Wolsted, '16, with the Y. M. C. A., at Camp Dodge and Clarence Walter, '14, at Camp Meade.

This may not be a complete list of the alumni who are in active service and the locations of some of those mentioned may have changed since last heard from. It will be appreciated if anyone who can assist in correcting the list and keeping it up-to-date would communicate with the alumni association, who are making an earnest effort to keep as close track of the members as is possible.

Undergraduate Students in the War Service

G.A.M. Anderson	Fergus Falls, Minn.
Mark Andrews	Fargo, N. D.
Myron Bachman	Fargo, N. D.
Sidney Baker	Devils Lake, N. D.
Albert Percy Beals	Fargo, N. D.
Harold Behlmer	Fargo, N. D.
Theodore Benson	Michigan, N. D.
Einar Blix	Fargo, N. D.
Lawrence Bohnhoff	Valley City, N. D.
Byron Box	Casselton, N. D.
L. M. Byrne	Minot, N. D.
A. B. Carlson	Minot, N. D.
Harry Carpenter	Fargo, N. D.
Joseph Dwire	Lisbon, N. D.
Edward C. Duffy	Fargo, N. D.
Roy V. Dunbar	Cando, N. D.
Elmer Dynes	Fargo, N. D.
Ralph C. Elliott	Westport, N. Y.
Walter Elliott	Des Moines, Ia.
Sivert Erickson	Kensal, N. D.
Jacob Fjelde	Fargo, N. D.
Adrian Foley	Bartlett, N. D.
N. D. Gorman	McCanna, N. D.
Fred Gram	Fargo, N. D.
Donald Hall	Fargo, N. D.
Carl Hanson	Fosston, Minn.
Houghton Harrington	Fargo, N. D.
Peter Homme	Granite Falls, Minn.
Edwin Hooper	Fargo, N. D.
Edgar Houser	Napoleon, N. D.
Lynn Huey	Fargo, N. D.
Mark Keeney	Fargo, N. D.
Harold Keeley	Galesburg, Ill.
William Keye	Fargo, N. D.
Frank Kouba	Lidgerwood, N. D.
Jesse A. Krueger	Rib Lake, Wis.
George Kuehn	Fargo, N. D.
Arnt Lee	Fargo, N. D.
Glenn Livingston	Sundance, Wy.
H. G. Loftus	New Brighton, Minn.
A. A. Lorshbough	Fargo, N. D.
Maxon Lough	Fargo, N. D.
Ralph Movold	Fosston, Minn.
James McCormick	Devils Lake, N. D.
Bjorn Myrdal	Fargo, N. D.
Melvin McGuigan	Davenport, N. D.
Donald McKee	Fargo, N. D.
Duncan McLeod	Crary, N. D.
Wm. McLeod	Medora, N. D.
Miles E. Nelson	Fargo, N. D.
Alex Nemzek	Moorhead, Minn.
John Nolet	Jamestown, N. D.
B. S. Oderkirk	Moorhead, Minn.
Lawrence W. Olwin	Fargo, N. D.
Myron Omlie	Grafton, N. D.
Elder Ottis	Kindred, N. D.
Paul Peterson	Moorhead, Minn.
Nels Reitan	Petersburg, N. D.
Herbert Riebe	Pingree, N. D.
Adelbert Rusfeldt	Hawley, Minn.
Walden A. Shinn	Bantry, N. D.
John B. Schulze	Cando, N. D.
John Stahl	Mankato, Minn.
Tracy Stahl	Mankato, Minn.
Robert S. Taylor	Duluth, Minn.
Carmie Thompson	Hampden, N. D.
Theodore Thorfinson	Munich, N. D.
Marc Troyer	Duluth, Minn.
Wayne Underwood	Enderlin, N. D.
Paul Vlasek	Grafton, N. D.
Orin Walter	Berlin, N. D.
Ben O. Wold	Moorhead, Minn.
Wm. Zimmerman	Casselton, N. D.
W. A. Stewart	Hilby, N. D.
Vernon Sanford	Fargo, N. D.
Dunbar Cole	Fargo, N. D.
Wm. F. Berner	Livingston, Mont.
Ray Boyd	Pingree, N. D.
Omelo Davis	Buxton, N. D.
Geo. Freeman	Upham, N. D.
Leslie Herron	Leith, N. D.
Mark Holmes	Pollock, N. D.
John Johnson	Upham, N. D.
Egmund Koeneman	Moorhead, Minn.
Enoch Frojen	Oakes, N. D.
Einar Myrdal	Edinburg, N. D.
Stanley Nichols	Ypsilanti, N. D.
Park Tarbelle	Fargo, N. D.
Thordar Thordarson	Upham, N. D.
Peter Elliott	Fargo, N. D.
Sidney Hooper	Fargo, N. D.
Roland Magill	Verona, N. D.

If you know of any A. C. student not mentioned here who is in the War Service of the United States we would appreciate being notified.

COLLEGE AND STATE

A Publication of the North Dakota Agricultural College, Fargo.

Vol. II. JANUARY-FEBRUARY, 1918 No. 1

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B. F. Meinecke, '99.
Levi M. Thomas, '09.
Wm. Guy, '16.

College and State has for this issue been turned over to the alumni association, with Walter Baumgartel, '16, as editor. To Mr. Baumgartel has fallen the work of securing the material which appears herein and to him belongs the credit of bringing out this alumni number.

Editorial Board.

The editor wishes to acknowledge his sincere appreciation of the splendid co-operation extended to him by the various contributors to this number of College and State. Their early and cheerful response to his requests has made his work a pleasure. Those to whom he is largely indebted for the success of this issue are Miss Hildur Sorenson, '14, who compiled the alumni directory which is appended to this issue, Miss Marion Johnson, '18, who designed the first page, and Professors Weeks, Parrott and Arvold, whose many valuable suggestions greatly facilitated his work.

We are not running an editorial page in this issue for we realize the incivility of preaching to those who have a much broader experience than our own. We will not be satisfied, however, until we have called your attention to three items.

First: Read the message of our president over thoroughly and make up your mind to heed it.

Second: Remember, that we want to hear from you often and at all times welcome your suggestions and co-operation.

Third: Make up your mind now that you will be present at the Alumni Home-Coming, June 10th to 12th.

In this issue of College and State no reference has been made to the various college activities and organizations. We felt that we could not do justice to these features at this time without destroying the distinct purpose of the publication. We hope, however, to be able to publish an issue later in the school year devoted entirely to this field.

Send us your latest picture or snap shot. We like to see how much you have changed since leaving school.

This year the alumni association remembered all college graduates of A. C. with a Christmas greeting. Did you get one? If you did not, give us your correct and permanent address, for that is the only reason it failed to reach you.

Our President's Message

Louise Fitzgerald, '16

NOW that we have an active part in the greatest war of history, it becomes our duty and privilege to so conduct and regulate our lives, that we can be of the greatest helpfulness to our country.

Our honor roll shows that a large number of alumni are doing their duty in the military service of the country. Those of us who are not able to make such sacrifice must serve in other ways. When we are called upon to support funds that are alleviating the sufferings of the wounded, and the refugees of war or are promoting the well-being of our men in cantonments and at the front, we should contribute as far as our means permit. We should all resolve to promote the saving of food by the example that we set in our homes. We should enlist the co-operation of as many organizations and individuals as possible to eliminate waste and to stimulate the intensive growth of staple food products.

We should and we are doing all of these things which will advance the cause of democracy, but in the meantime, let us not forget our Alma Mater. Dear A. C. has done much for us. We should try in some small measure to repay her, for she needs our help and co-operation always.

It is of interest to know that the largest freshman class in the history of our college is now trudging up the steps of Main Building. Each year, too, larger senior classes go forth splendidly prepared to broader fields of usefulness. Alma Mater is "always growing and always young." Let us be loyal to her and gather those seniors unto our alumni association so that it too shall grow, proportionately. Let us have a strong vitalized organization that will keep our graduates united and working for the best interests of Alma Mater.

One very important and very necessary way that we can be loyal to our association and our college is to respond to the letters which the association secretary sends you. He does this because he wishes to see the organization which he represents, which you represent, and which represents your college a success.

Have you paid your membership fees?

Did you send in a list of news or an article, or picture that helped to make your issue of "College and State" a success? If you did we thank you, for your splendid response. Wouldn't you like a magazine of this kind more often; one "chuck" full of news, and interesting items. If you would; keep on contributing articles, write and give your ideas and your experiences, then we can begin to plan for the future and the establishing of a publication that will be representative of alumni ideals and policies.

We alumni, being located in so many parts of this state and other states, have an opportunity to influence many students to come to A. C. to school. We should make them realize how important it is, for their own welfare and the welfare of our nation, that there should be large numbers of college trained men and women to aid in reconstructive work after the war. Each one of us knows the advantages of training and opportunity given in college. Each one of us knows still better the inestimable value of the training received at our own college. So, to influence the young men and women to avail themselves of this training is one of our greatest expressions of loyalty to A. C.

Another way that we can express our true devotions to our college is to come home in June. Let us plan now to make Commencement in 1918 the biggest Home-Coming Day that A. C. ever had. Make some sacrifice so that you can be here at Commencement time with other alumni and friends. The renewal of college ties, the rejoicing over successes of friends, and classmates, the casting aside of world acquired dignity and assuming again college day informality, will all make not only for a few memorable days of reunion, but will aid in increasing a larger loyalty to home, nation and humanity.

"DO YOUR BIT"

You enjoy news from the Agricultural College and your classmates. They are equally anxious to hear from you. This is your opportunity and here are some suggestions.

Give us your autobiography since you left college. For ideas see Saturday Evening Post;

Give us any "dope" you may have on other alumni;

Send us any good photos or snapshots you may have which will be of interest to your friends;

Tell us about your traveling experiences;

Have you held any political or honorary offices? What are they?

Have you any good laughs to pass along?

What! You don't like to tell about yourself? If we were all so modest we would not have such a thing as a newspaper.

Address communications to Alumni Association, Agricultural College, N. D.

The executive committee at its first meeting, November 3, 1917, passed a resolution waiving the dues of boys in the military service of Uncle Sam for the period of the war.

Arnold Christianson, '16, is now county agricultural agent at Pierce County with headquarters at Rugby. This fall he secured 17 cars of feed oats and 14 cars of potatoes at cost for the farmers in his county.

Dr. Thomas F. Kane, recently president of Olivet College, Olivet, Michigan, and formerly president of Washington University, has been selected by the Board of Regents to succeed Frank L. McVey as president of the University of North Dakota.

A pleasant gathering of A. C. alumni took place on January 4, 1918, when thirty graduates enjoyed luncheon together at Ceres Hall.

Professor Milton Hanke, instructor in physiological chemistry for the past year and a half has resigned his position to take advantage of an unusually good position offered him by the research laboratory of the health department of the city of Chicago.

Charlie Ellis, '17, was a recent visitor on the campus. For the past year Mr. Ellis has been paint chemist for the Patterson Sargent Paint Company, Columbus, Ohio. He is now to take up a similar position with the Barrie Varnish Co., Detroit, Michigan.

Mr. T. A. Hoverstad has been elected by the Board of Regents on the recommendation of Pres. Ladd to take a position in the extension service. Mr. Hoverstad was formerly superintendent of the Farmers' Institute for this state. Recently he has been extension director for the Soo railroad. He takes his position February 1.

Alumni—Wise and Otherwise

c/o Camp Quartermaster,
Camp Grant, Rockford, Ill.

Dear Doc.:

You may have to resort to the waste basket route or else completely revise and redress the enclosed. Either course has my entire sanction. I wrote the enclosed "between times"—and can't say that I even reread it—so if it is disconnected and out of tune—*blame the Kaiser.* We blame everything else on him, so he won't notice this little extra load. Give my regards to the boys and professors.

With the season's best wishes, I am

Yours sincerely,
Dick.

Fellow Alumni:—

As you can undoubtedly recall, I am too modest to write about myself, but I havn't a solitary thing of interest to relate unless I bring yours truly into the discussion as he always seems to be around when I am on duty.

I came to this camp about the middle of August amidst—not the waving of flags and the music of the band—but great clouds of dust and a real corn belt heat wave. Of course it rather hurt my vanity to see that no one was expecting me except a guard who insisted on going thru my bag in search of wet goods. All he found was a bottle of hair tonic called "The Twentieth Century Scalp Invigorator and Hair Grower." It may be the first, but I know it falls short of the latter. To my consternation he insisted upon confiscating the priceless bottle—and I'll have to admit that it did smell suspicious but by removing my hat—(a sign of respect)—and talking nice I finally was allowed to enter camp with the tonic in my possession. He might just as well have kept it, tho, for it did not do me one atom of good.

During the first two months of my stay here I played guardian angel over the food for mules and jackasses—also the camp jewels—these camp jewels are of priceless value, specially in cold weather, and to convey some idea of importance I may add that I handled carloads of them—yes, coal is certainly a necessity. Maybe my connection and experience with coal will stand me in good stead sometime in the future. It would be just my luck, tho, if they don't burn coal in the hereafter.

During the last six weeks I have come to know just how a sub on the football field sees the world.

Latest gossip has it that I am or have been detailed to attend the officers' training school which begins on January fifth, probably in the capacity of kitchen police, or room orderly—anyway, why worry? None of us will know the difference a hundred years from now.

Very truly yours,
Sarg. S. K. "Dick" Bjornsen, '17.

The cost of living is going up but alumni dues still remain $1.00 in spite of the war.

Ordnance Mobile Repair Dept.,
2nd Division, Chickamauga
Park, Ga.

Fellow Members:—

I enlisted September 18, 1917, in United States Reserve, Ordnance Corps, at Rock Island Arsenal, Ill. Three days later, September 21, 1917, I was made corporal, ordnance department.

At Rock Island Arsenal, I was given instructions in the repair and maintenance of 3-in. 4.7-in. guns, 4.7-in. and 6-in. howitzers.

October 18, 1917, I received orders to report at Chickamauga Park, Ga. I arrived two days later. Received equipment and I am waiting for orders to leave for France.

This branch of ordnance service is new and covers repairs of all mobile war machinery, trucks, etc.

Yours truly,
Corp. Gordon A. Stumpf, '14.

On leaving college the field of the county work of the Young Men's Christian Association attracted me to Iowa, where I worked in O'Brien County for one year. The call for better preparation in my chosen field led me to enter the University of Chicago in the fall of 1915, specializing in the graduate department in religious education. In the spring of 1917 the degree of master of arts was given me. My plans were all set to enter the state work in Michigan when the fortunes of war withdrew state secretary, A. B. Dale, to the camp secretaryship of the Y. M. C. A. at Camp Dodge, Iowa. The state committee of the Y. M. C. A. called me to take his place and here I am in the old state we all love. As campaign director of the recent army Y. M .C. A. campaign my time has been more than filled. That being over, we are centering our attraction on the extension of the county work organization over this state. In this great task we are expecting the Agricultural College to supply us with many leaders with a great vision of Christian service for the upbuiding of our state.

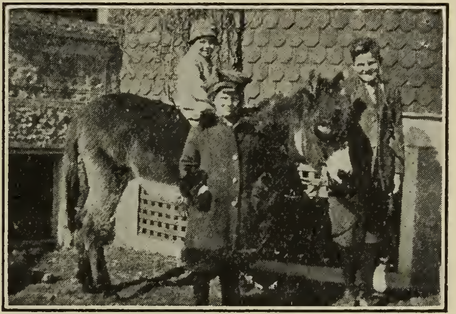
D. E. Sonquist, '14.

Enterprise, Kansas,
Dec. 22, 1917.

Alumni Association,
Agricultural College, N. D.

I am enclosing check for $10.00 to be applied in your association as you think best. Any time you are in need of a dollar or two I shall be glad to do my bit.

At present I am employed as chief engineer for the J. D. Ehrsen Mfg. Co. of Enterprise, Kansas. This company manufactures a full line of power transmission machinery, also elevating and conveying equipment as used in grain elevators, flour mills, cement mills, mines and so on. My work is to help design the lay outs as well as to sell—furnish estimates and so on.



Besides being my home town and the home of the J. B. Ehrsen Manufacturing Company, the other distinction of Enterprise is that it is situated in the geographical center of the United States. Manhattan, the Kansas Agricultural College town, is about forty miles away and Fort Riley and Camp Funston about eighteen miles.

Mrs. Heath (who was a professor of domestic science at the N. D. A. C.) and I have three children—two boys and a girl. Sam, thirteen years old, in high school; Josephine, eleven years—seventh grade; Hal, seven years, third grade.

We are enclosing a few snap shots of our home and the children.

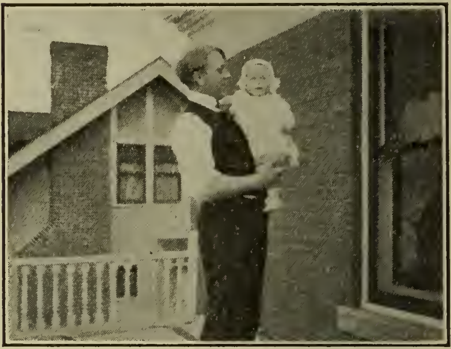
I hope it may be my pleasure to be with you at the annual reunion this coming year.

Thomas H. Heath, '00.

A. M. Christensen, '16. Introduced myself to my unlucky parents, who have the same name, about the time of or prior to the World's Fair. Am unable to give the specific time of my arrival, as the clocks of that time were not equipped with luminous dials and hands. Had I been consulted in the matter, would undoubtedly have chosen North Dakota for my port of entry, but due to unforeseen circumstances over which I had no control, Illinois shall always be written after the question "Where were you born?"

Being in rather close quarters as a youngster and being more or less ambitious, it was natural for me to rise in the world. Inasmuch as the only direction I could go in, living amongst the skyscrapers of the "Windy City," was up, it was natural for me to attain the desirable height of six feet, one and one-half inches (one inch less when shoes are subtracted). My chief delight is in standing in a dense mob and seeing all that goes on while those poor mortals below the level of my chin call me names as if I ever was related to a telephone pole. My duties at present consist in seeing how many farms I can pass between sunrise and sunset without becoming intimately acquainted with the five letters Webster calls roads. My hardest job is arguing with Annabelle, full sister of Henry Ford, in such a way as not to disturb the sanctity of the church, especially on mornings when the mercury in the thermometer endeavors to follow those poor mortals who chose the trip to—(not heaven). My chief fear is that I may not return from the war to convince Her that two can live as cheaply as one.

M stands for Maurice, my middle name, which was thrust upon me without my voting on the matter and in order to do the name justice it has become necessary for me to accept such facial features as are generally supplied the owners of aforesaid name, namely a large bent protuberance on that portion of my anatomy bounded by the eyes, ears and mouth, and the ready acceptance of such nicknames as are applied to folks attending synagogues regularly, tho I am not a member of one. Pembina and Casselton, N. D., have been the recipients of all my voluminous writings, the post office my savings.



1910-12, taught agriculture in high school of Alexandria, Minn. 1912 and '13, pursued graduate study in college of agriculture, University of Illinois. Obtained degree M. S. June, 1913. 1913 appointed assistant professor in agronomy, college of agriculture, University of Minnesota.

Sept. 2, 1914, married Miss Myrtle May Stolz, Argyle, Minn.

Feb. 1, 1916, bought a Ford.

Feb. 23, 1917, presented with Vinnie Elizabeth Olson.

At present time—assistant professor in agronomy, college of agriculture, University of Minnesota, and assistant in agronomy, agricultural experiment station. Specialty, plant breeding. Present address, 1298 Raymond Ave., St. Paul. When in town, come and see us.

P. J. Olson, '10.

If your young friend is not enlisted in war service the agricultural and engineering field is the place for him. Use your influence.

Mr. Addison Leech, for two years secretary of the Agricultural College, has handed in his resignation to take effect at the end of this school year.

On September third occurred the marriage of Asta Mikkelson of Garske, and Gabriel Lundy, '14. Last spring Mr. Lundy received his master's degree at the University of Wisconsin and he is now assistant cashier of the State Bank of Eckman at Eckman, North Dakota.

Kathrine Keye, '16, of the class of 1916 was married at the home of her parents in Fargo on December 11th. The fortunate young man was Arno Lorshbough, formerly of Fargo—now a lieutenant of the U. S. army.

Among the June weddings of the past year is that of A. C. Sorenson, '15. "Chris" has always shown a particular interest in university girls and consequently Miss Ann Millar now shares his "honorable" name.

Robert Bruce McKee, '16, is also on the honor roll—not for bravery at the front but for courage to face domestic battles. His most worthy opponent is Miss Myrtle Flaten, a Fargo College alumna.

The holiday season was one of great rejoicing for Ernest Pile, '17, when he became, so far as we know, permanently attached to Miss White of New York. Let us hope her position will enable her to assist in the conservation of the nation's food.

Roy Dynes, '14, is another one of our alumni who has joined the matrimonial ranks within the past year. He married Louise Poland, a former A. C. student, and they are now making their home at Cavalier, N. D.

The freshman class of this year was forty-three percent larger than last year's class. With your help we may double this increase next fall.

Miss Delia Johnson, '17, who has recently been connected with the bacteriology department at the University of North Dakota, has accepted a position in Fargo as city bacteriologist. Delia is rapidly climbing the ladder.

The teaching profession no longer holds any attraction for Ruby Gibbens, '11, for now she is connected with the agricultural extension department at Ames, Iowa.

Have your sorority or fraternity plan their homecoming for June 10-12.

Fern Dynes, '12, and Lucy Cockburn, '12, decided they would like a change of scenery this year; the result is they are both teaching in Montana, Fern at the Kalispel High School and Lucy at the Fergus County High School at Lewiston.

Mabel and Marion Cox, '13—'14, and in fact the whole Cox family are spending the winter at Tucson, Arizona, where Mabel is recuperating from a serious illness. Those of us who know Mabel know that she will come out on top just as she always does.

Casselton no longer needs to be convinced of the excellent preparation and ability of the home economics graduates of the A. C.; she stands convinced. Amy Whitman, '15, is now holding down the position there formerly held by Fern Dynes.

Announcements have recently been received of the marriage of Myrtle Waechter, '16, to Clarence A. Ransom, the fateful event having taken place on Christmas day at the bride's home in Glen Ullin.

Unable to endure the severe North Dakota winters without the protection of Melvin McGuigan, Miss Eleanor Kindred, '17, journeyed last September to Houston, Texas, where "Mac" was stationed. More wedding bells.

Rumor has it that Veta Berner, '13, Alma Erickson, '14, and Rosabelle Magill, '13, are married, but as yet we have been unable to ascertain whom to congratulate. We also understand that Harry Herbrandson is no longer a bachelor.

Mabel Ewen, '16, was a visitor at the college just after the holidays. Miss Ewen is principal of the high school at Binford, N. Dakota. She has many good things to say for Binford as a town with real civic spirit.

It will not be long before D. W. Mendenhall, '14, will be celebrating his first wedding anniversary at Glendive, Montana, where he is putting his education into practice.

Speak a good word for your institution every time you have an opportunity.

Miss Laura Taylor's name also appears on the list of the newlyweds. Mr. Milo R. Cobb of Elk Horn, Wisconsin, is the one to be congratulated.

Joe H. Alexander, '16, who has been assistant editor to Doubleday Page & Co., of New York, for some time has now become the managing editor for the well known agricultural journal "The Field Illustrated". This periodical is published by the Advanced Agricultural Publishing Co. of New York City. Mr. Alexander has won a very creditable place in the field of agricultural journalism in the short time in which he has been in this work.

Lloyd Kelly, '16, is at present in the federal service. He is assistant material engineer in the bureau of construction and repair of the navy department. Mr. Kelly is still interested in the paint company which owes its existence to him. He is giving his country first consideration.

Thomas J. Jackson, '14, has resigned from his position with the federal Indian service bureau to pursue an agricultural career on his own initiative. He has bought a section of land near Newfolden, Minn., where he will raise pure-bred sheep.

Mae Engelhorn, '15, has taken a position in the central laboratory of Swift Co., Chicago.

Leo P. Nemzek, '09, resigned his position as chief chemist for the John Lucas Paint Co., Gibbsboro, N. J., to become consulting chemist for the Dupont corporation, which has recently assumed control of several large paint manufacturing concerns in the east. His present headquarters are with Harrisons, Inc., Philadelphia, Pa.

Thomas F. Manns, '01, is the head of the department of plant pathology and soil bacteriology at Delaware College, Newark, Del.

Madeline Blake, '17, who has been teaching at Dawson, Minn., has accepted a splendid offer to teach domestic art at Gilbert, Minn. Boletha Frojen, '16, teaches in the same school.

Ruel Wije, '14, of forensic fame, has resigned his position as county agent of De Smet, S. D., and is managing his father's large farm at Dazey, N. D.

Edgar J. Olson, '12, is in charge of farmers' institutes, in the commissioner agriculture's office at Bismarck.

Bertha Gunderson, of the all-famous class of '16, visited with "Sully" Grest during the holidays. Bertha is wearing a carbon on her third finger presented her by a Frenchman with an unpronounceable name.

Genevieve Grover, class of '15, who has taught in Winona Normal for the past two years, is now a home demonstration agent with headquarters at Rugby, N. D.

Remember that our college is measured by your service in your community.

Clarence Williams, '14, is at present district sales manager for the Goodrich Rubber Co. He is located at Sioux Falls, S. D.

Olive Porter, '13, is teaching domestic science in the public schools at Bremerton, Wash.

It will be of interest to the students of agriculture to know that Mr. Grout, '08, has been working on experimental and constructive breeding since his graduation. Every present world's Red Polled record has been made in the Jean Du Luth herd during this time and this herd was unbeaten in 1917, exhibited at seven fairs. 50 official records made in the same Red Polled herd average 468 pounds butterfat. Mr. Grout's contribution to College and State will be found in this number.

A. C. "Grads," Now Employed by Their Alma Mater

Frank Ray Babcock, '08, Divide County, N. D., county agent.

Walter Baumgartel, '16, instructor in high school and coach in Little Country Theatre.

Ray Bolsinger, '16, asst. pure food inspector of the chemistry department.

Thomas X. Calnan, '13, county agent, Stutsman County with headquarters at Wimbledon.

Robert M. Dolve, '15, professor in mechanical engineering at the Agricultural College.

Roy C. Dynes, '14, county agent of Pembina County, headquarters at Cavalier.

Grover C. Edwards, '15, county agent in Ward County, headquarters at Kenmare.

Mathias Erickson, '09, assistant professor of mechanical engineering at A. C.

Louise Fitzgerald, '16, assistant state leader, boys' and girls' club work, Agricultural College.

Gertrude Gibbens, '13, home demonstration agent, Mott, N. D.

Genevieve Grover, '15, home demonstration agent, Rugby, N. D.

Wm. M. Guy, county agent at Devils Lake, N. D.

Martin S. Hagen, '17, pure seed laboratory, Agricultural College.

E. W. Hall, '09, county agent, Williams County, lives at Williston, N. D.

Katherine Jenson, '04, professor, home economics, Agricultural College.

Mattys Jongesward, '14, assistant state food inspector.

Wm. R. Porter, '06, superintendent of demonstration farms, Agricultural College.

Chas. H. Ruzicka, '11, superintendent of the Williston substation, Williston, N. D.

O. A. Schollander, '17, instructor in high school physics.

Theo. E. Stoa, '14, federal cereal investigations for N. D. Agricultural College.

Levi M. Thomas, '09, federal bureau of grain standardization, Agricultural College.

John C. Thysell, '08, superintendent of Dickinson substation at Dickinson, N. D.

L. R. Waldron, '99, plant breeder for the Agricultural Experiment Station.

Elsie Stark, '14, home demonstration agent, Mandan, N. D.

ALUMNI ASSOCIATION LIFE MEMBERS

A. C. Anderson	'12
F. W. Anderson	'14
B. H. Barrett	'12
Fern Dynes	'12
O. W. Dynes	'07
K. E. Darrow	'09
C. I. Gunness	'07
Angela Gibson	'98
Thos. H. Heath	'00
Katherine Jensen	'04
Alma Leeby	'12
B. F. Meinecke	'99
Elmer May	'05
Wallace Manikowske	'13
Cecile Manikowske	'16
D. W. Mendenhall	'14
C. O. Olson	'00
R. B. Reed	'95
H. A. Reddy	'95
Addie Stafford	'12
Mrs. E. F. Slocum	'04
O. A. Schollander	'17
Edith Shelton	'14
J. A. Swenson	'06
Alice Tibert	'14
O. A. Thompson	'01
J. C. Thysell	'08
Mary Thompson	'13
Mrs. Mary Weible	'04
R. D. Ward	'95

We would like to add your name to this list.

Miss Margaret Keene, class of '15, is teaching at Brainerd, Minn. She was more fortunate than most of the "cookin' teachers," in that she had three weeks vacation at Christmas time.

A. C. boys are certain of making good in Montana. County agents are in demand and our boys fill the bill.

E. W. Anderson, '14, is located at Plentywood, Mont.

Murray Stebbins, '16, at Glasgow, Mont.

Mathias Thorfinson, '17, is at Chinook, Mont.

Dean Mendenhall, '14, is at Glendive, Mont.

Carl Yerrington, '14, is at Miles City, Mont.

A few days ago M. L. Wilson, state leader for Montana, was a visitor at the college. He said that he came to find more men for his department. He highly recommends the work of the North Dakota boys. The fact that he was here to secure four more men speaks well for A. C.

What are you doing to boost the Agricultural College and its work?

William Stapleton, '14, has accepted a position as county agent in Montana. "Bill" made good in Minnesota so a larger field was opened to him.

Place the Alumni Association, Agricultural College, N. D., on your mailing list.

Professor Metcalf who has charge of the department of zoology has enlisted in the Balloon service.

The United States Food Administration for North Dakota has established its headquarters at the Agricultural College. Dr. E. F. Ladd is state director. He is ably assisted by Lorne Wilde formerly editor of the Fargo Forum and Mr. Baird, assistant state food inspector.

Have you been influential in sending a student to A. C.? Make good by sending one this year.

Miss Ethel Poole, '15, was lately wedded to A. M. Hammes of the pharmacy class of '13. They will make their home in Mandan. The best wishes of their classmates goes with them.

"That man is best educated who is most useful."

Miss Nevada Evans who was employed with the pure seed department of the college is back at her post after a year's absence during which she worked at the New Jersey experiment station.

Royal Drummond, '15, captain in the national army, was wedded to a young lady from St. Paul this fall.

Ray Reierson, '17, is teaching agriculture in the high school at Hitterdahl, Minn.

Miss Pearl Dinan, of the English department has been granted a leave of absence to do post-graduate work in English at Columbia.

Bill Guy and "Chris," wishing to apply in practice all the book agriculture which they had assimilated, planted a bean crop last summer, but we had no rain and they had no beans.

Mr. Galehouse, leader of boys' and girls' club work in North Dakota has resigned. He will return to his former home in Ohio.

Thomas P. Cooper, director of extension and experiment station at the Agricultural College, resigned his position the first of this month. Mr. Cooper has filled this post for the last two years with ability. He came to this state through the organization of the Better Farming Association, whose operations he directed until it was incorporated with the extension department of the college. Since that time he has been actively engaged in the organization of extension and county agent work in North Dakota.

During his administration twenty-eight counties were brought into active co-operation with the extension service. Mr. Cooper has accepted the position of dean of agriculture with the University of Kentucky.

Have you contributed an article or news item to College and State? Now is a good time to begin.

When asked with regard to the reorganization of the work at the Agricultural College, Dr. Ladd stated that vast improvement would come, in his judgment, from the separation of the work of the experiment station from that of the extension division. The two fields of work are not at all similar or even parallel. The function of the experiment station is to carry on research, to make investigations, and to publish the findings. There is needed for this work a director who is thoroughly trained in scientific methods with a keen appreciation of the needs and the value of research work as applied to agriculture. Such a man we now have in Dr. Van Es. His whole time and thought will be along the one line of developing this most important and essential field as a feeder for college educational work and for the extension workers in the field.

On the other hand, the function of the extension director is quite different. Here there is needed a man with a broad vision, a good organizer, a man who can enthuse his field workers, and at the same time, carry forcibly a message to the people of the state so as to ensure support from all parties interested. He will also be in close touch with college activities so that the teachings of the extension workers may harmonize with those at the college in subject matter. It is believed that in Mr. Randlett we have found such a man. The fact that he will be able to give his entire time and thought to extension activities ensures better work than if he were obliged to divide his thought between problems of research and those of entirely different nature in the conducting of extension activities.

Each director will organize the work of his own division and with the assistance of his associates as heads of the various departments, we believe will be able to accomplish more than by the old method. Besides, in the reorganization, the work of the Agricultural College now stands with its four co-ordinate divisions, each with its own director and staff of workers, namely:

1. Collegiate Division.
2. Division of Experiment Station.
3. Division of Extension.
4. Division of Regulatory Work.

and the directors of these four divisions, with the president, form an administrative board that can better co-ordinate all the work of the institution in its varied fields of activity.

Gordon W. Randlett, '08, returns to take charge of the extension department of the North Dakota Agricultural college a position which he held for four years prior to taking his present office in charge of the extension department of the South Dakota Agricultural college at Brookings, S. D. When he went to Brookings, two and a half years ago, there were but three counties organized for county agent work in that state. At the present time there are 39 South Dakota counties organized each with a county agent.

Mr. Randlett was largely instrumental in putting North Dakota on the map as a corn raising state. He organized the boys and girls club work in North Dakota and when he left the state he had about 12,000 North Dakota boys and girls organized in these clubs.

Mr. Randlett founded the corn show in Fargo which was a remarkable success for several years, and the North Dakota corn exhibits taken by him to the national corn show attracted the attention of large numbers of people to this state.

The boys and girls institute which meets each December at the North Dakota Agricultural college was originated and organized by Mr. Randlett. He also did a great co-operative work with the teachers and county superintendents of schools of the state as a result of which many of the school children of North Dakota became interested in the North Dakota Agricultural college.

Dr. Leunis Van Es, who is named director of the North Dakota experiment station is recognized as one of the foremost veterinarians of the United States. In fact he has an international reputation and he is recognized in Europe as an authority on veterinary science. The United States department of agriculture sent Dr. Van Es to Europe on two different occasions to represent the United States at the meetings of the international veterinary association.

Dr. Van Es worked out the tuberculin test for Avian tuberculosis, which had puzzled veterinarians for years. He has done extensive work in tuberculin testing and in hog cholera prevention thru the use of serums. He has also made extensive investigations of swamp fever. He is recognized as one of the best authorities on all these subjects.

He has proved his executive ability on numerous occasions. Beside the scientific knowledge and his practical work along agricultural lines, he is a remarkable linguist. In making reports on his Avian tuberculin test he reviewed the scientific literature in nine different languags.

Dr. Van Es is a native of the Netherlands, and received much of his education in the schools of that land. He also attended Ontario veterinary college in Canada and the medical department of the University of Alabama.

He came to North Dakota from Mobile, Ala., in 1903 and has been in charge of the veterinary department of the North Dakota Agricultural college since that time.

Our Debt

Do we ever fully realize how much we owe the government we live under? Columbia has given us her all. She has been more than liberal. Opportunity, freedom, safety, education, economic advantages, public lands, yea—everything has been given us with lavish hand. No distinction has been made between the native and the foreign born. All were welcome to all. Millions have come to our shores and they have been treated in the most liberal manner. And what has Columbia asked in turn of us? Practically nothing; she has given us everything and asked nothing.

Our boundless prairies were gifts to the men who wanted them. We have received economic advantages such as the common people of Europe never dreamed of. Opportunity has gone begging. We have been drunk with freedom. Educational advantages, even in the highest of our institutions, are free for the asking and all this for nothing. Truly our debt is great.

The time has come when Columbia asks us to repay a small part of what we owe her. Today is a day of reckoning. Some of our men, and women too, are going to the battle-fields of Europe. Honor to them. As for the rest of us at home, it is our sacred duty to act in such a manner that the great cause Columbia is fighting for, shall gain by our every deed and word. Boost for the nation, the soldiers, the Red Cross, the conservation of our food, the president—then we shall be repaying in part that which we owe Columbia.

C. G. Carlson, '15

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COLLEGE AND STATE

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To Train Vocational Teachers

The federal board of vocational education has designated this college as the institution in the state for the training of vocational teachers under the Smith-Hughes act. This action was taken early in the present year.

The federal act provides for the training of teachers of trade and industrial subjects, for the training of teachers, directors, and supervisors of agriculture and for the training of teachers of home economics. The Smith-Hughes act involves the offering of courses supplementary to those already established at the college and will prove an important stimulus to the work for vocational teachers, both by providing funds for the training of teachers, and, thru aid to vocational schools thruout the state, by increasing the demand for vocational teachers.

The law specifies the requirements for teachers of agriculture in schools in North Dakota receiving federal aid. The teacher of agriculture must be a graduate of the four-year agricultural course in a standard agricultural college. He must also have two or more years of practical farm experience. The qualifications for supervisors of agriculture include, in addition, at least two years experience in teaching agricultural subjects or directing a system of agricultural instruction. A supervisor must be at least twenty-five years of age.

The teacher of agriculture under the Smith-Hughes act must have pursued general courses in agriculture and in addition two minor subjects, in two departments in agriculture. His preparation in education includes the history of vocational education, agricultural education, special methods in each of three agricultural departments, general psychology, and educational theory and practice. Certain requirements are made in chemistry, biology and other science. Two years of English are required. Industrial history, rural economics and rural sociology are in the list of required subjects.

Three kinds of teachers are required for the industrial instruction contemplated, — teachers of shop practice, teachers of related subjects, and teachers of non-vocational subjects. For teachers of shop practice adequate trade experience will be required as well as graduation from high school. Teachers of related subjects must be graduates of a four-year high school and have had at least two years education in a technical school of college grade, and successful contact with the trade or trades for which related instruction is to be given. The graduation requirements for industrial teachers will be the completion of a four-year course including satisfactory trade contact or an equivalent in technical and shop subjects taken at the state agricultural college.

Teachers of home economics under the Smith-Hughes act must, in North Dakota, be graduates of a four-year college course in home economics of standard grade and present satisfactory evidence of at least two years practical experience, including a considerable period of actual home management. The subjects to be studied in such four-year course include technical subjects embracing supervised home management, related sciences and arts, and pedagogical subjects including special methods and supervised practice teaching in home economics.

The college offers curricula preparing teachers for the lines of work under the Smith-Hughes act. The school of home economics offers the training required for teachers of home economics. The school of education offers curricula for teachers of agriculture and of mechanic arts. In addition to curricula conforming to the Smith-Hughes act curricula for teachers of science and for rural and vocational school administration are offered.

The Garden as a Factor in the Increase of Food Production

C. B. Waldron, Dean, School of Agriculture

In times of acute labor shortage when there is at the same time a necessity for the maximum production of all the staple food crops, the question naturally arises as to how much time and expense can be devoted to the growing of garden crops.

The garden is frequently looked upon as more or less of a luxury, to be indulged in by people not pressed for time and who do not need to reckon carefully the matter of expense. While there is a certain phase of gardening that might come under this head, as catering to our tastes rather than supplying our actual needs, yet there is a possibility of growing certain garden crops that will give a larger return in the way of food supply, for the time and money expended, than can be obtained in almost any other direction.

Under the existing conditions, it stands to reason that the only kind of gardening justifiable is that which contemplates the production, in considerable quantities, of the staple food crops; particularly those that are not ordinarily grown under field conditions.

It is not difficult to make a list of the garden crops having the highest relative food value. These include the leguminous crops like peas and beans, the root crops, sweet corn, and, to a certain extent, crops grown for their leaves and stalks, like lettuce and celery.

The labor and expense in growing a garden are necessarily greater than for any field crop of the same area, and for that reason it is important that the soil used for garden purposes be made very productive. It is not worth while to spend time and money trying to grow crops of high value on poor land. It is likewise important to have the garden so planned that the crops can be grown with the minimum of labor. This means either planting in long rows that can easily be cultivated with field machinery or else planting in connection with some cultivated field crop like corn or potatoes, so that the garden may be cultivated along with the field crop.

Since most garden crops are of inferior quality unless grown rapidly, it is important to have the soil well supplied with plant food. Thirty or forty tons of well rotted stable manure should be plowed under for each acre of garden in order to get the best results. If well rotted manure is not available, it is better to plant the garden without manuring than to put on fresh manure. We have found that the productiveness of a garden depends more upon tillage than upon the application of fertilizers, as most North Dakota soils are sufficiently fertile to grow good crops if they are given the proper cultivation.

If the garden has not been plowed in the fall it is important to plow it early in the spring, as many of the garden crops do not make a satisfactory growth unless seeded at the very beginning of the season.

Most people who are likely to grow gardens are already sufficiently familiar with the methods best suited for growing the ordinary crops, so it is hardly necessary to give, in detail, directions for this work. Many of the directions given in treatises on gardening are not very practical, because they contemplate too much hand work. Almost without exception, the garden rows should be three feet apart to permit of horse cultivation. This is important not only from the standpoint of saving time but also for the purpose of conserving soil moisture. It is hardly possible to give gardens the proper tillage with the hoe to keep the soil thoroly mellow and thus in condition to retain moisture.

If one feels that he is to be limited for time, he had better confine himself to a few staple crops from which he may reasonably expect good results. The crops that need to be seeded very early are peas, onions, beets and lettuce. Those that may be seeded about the first of May are the root crops and the later peas. The tenderer crops like corn and beans can be planted any time from the tenth of May up into early June.

The necessity of rather constant cultivation of garden crops from the very first is well understood by all who have ever made any very serious attempts at gardening.

The garden should be so planned as to furnish one or more varieties of vegetables at any time thruout the growing season and, to a certain extent, thruout the year. This will necessitate the selection of varieties maturing at the different seasons and also a succession of seedings of the same variety, with certain crops. It will also be necessary to study and apply the most practical methods of drying, canning and storing vegetables. Corn, peas, beans and asparagus can be readily canned and thus be made a part of the food supply thruout the year. Onions and the root crops can be stored in pits, or boxes of moist sand, so they will keep fresh thruout the winter.

If one questions the economy of trying to grow garden crops, he might compute the cost of as much canned corn as could be grown on one-tenth of an acre. The same thing applies, in a measure, to several other of the standard garden crops, and in times like these, when the food supply has reached an acute stage, not only in the matter of quantity, but variety, it has become almost a necessity that we make our gardens produce a large part of the food that will be required for our own people. Unless our arch-enemy had adopted this course, the war would have been over before the end of the second year. It is only because the European gardens have been made so productive that any of the nations now at war have been enabled to continue. It has become an axiom that food will finally win the war, and we must learn and practice the art of food production as we never have before.

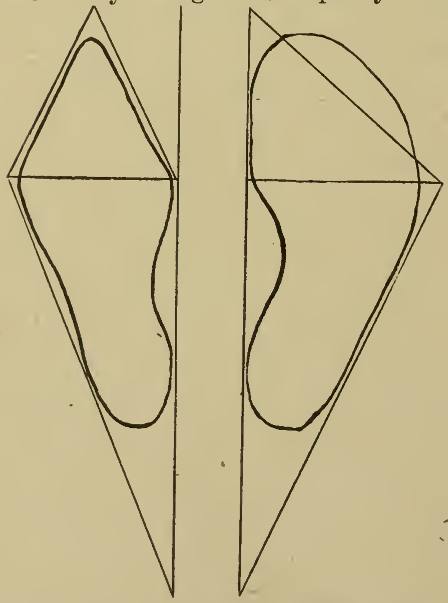
The Hygiene of the Normal Shoe

Marie Kammeyer
Instructor in Hygiene and Physical Training for Women

Why is the percentage of normal walking women much lower than that of men? Women naturally walk with a wide base because of a wide pelvis; but this natural tendency is increased by wearing abnormal shoes which abduct the feet, rotate the hip joint outward, and cause the ungainly and ungraceful walk characteristic of women wearing the abnormal shoe. Men toe ahead more easily than do women because of a narrow pelvis, and, moreover, they aid nature by wearing more nearly normal shoes.

In order to understand the difference between normal and abnormal shoes, it is necessary to briefly consider the anatomical structure of the normal foot. The bones of the foot are so arranged as to form an arch on the inner border, the purpose of which is to save the body from jar, and this arch is supported by ligaments which are non-elastic and by muscles which are elastic according to their strength or tone. The bony arch alone can not support the body weight, neither can the ligaments alone support the arch, for the weight of the body would cause the small bones in the arch to separate, thereby stretching the ligaments and causing the arch to fall. Therefore the strength of the arch depends upon the strength of the muscles, or muscular tone, and not upon the height of the arch. The tone of any muscle is increased by exercise and work, and decreased by inactivity and support.

To determine a normal foot, draw an outline of the naked foot on a sheet of paper, being careful that the body weight is equally distributed on both feet. The pattern should show a greater diameter at the base of the large toe, the heel narrow, and the toes should form a rounded contour and not a narrow point. The height of the arch can be determined by the imprint of a wet foot on the floor. To take this imprint correctly, weight should again be on both feet. The imprint should show each toe separately, and the ball of the foot and the heel joined by a narrower strip on the outer border of the foot. If this strip is wide through the center, the arch is low and this may indicate a fallen arch. However, there are normal low and normal high arches and a low arch does not necessarily indicate a fallen arch, unless there is pain, and this latter condition would be due to overstrained muscles and ligaments.



There are two important factors to be considered regarding the harmful influences of abnormal shoes upon the muscles and ligaments which support the arch. First, we will consider the pointed toes of the present-day shoes. Squeezing the toes into a pointed shoe causes a partial dislocation of the large toe and the result is a bunion, or inflammation of that joint. Corns will also appear on and between the toes. This is all uncomfortable to say the least, but the greater harm is done to the muscles by abducting the foot, thus keeping the muscles in a continued stretched condition. (Abduction, or toeing out means a weak foot; and adduction, or toeing in toward the median line, means a strong foot.) These stretched muscles soon lose their tone; in other words, their power to recoil or contract, and the ultimate result is a weak arch. The second factor to be considered is the undue support to the arch of the foot because of the high heel and the arch of the shoe. This support takes the work away from the muscles and they in time become weakened because of their continued inactivity. The two above named conditions may cause weak and fallen arches.

Force a normal foot into an abnormal shoe and what is the result? This is practically putting the foot into a cast, impairing circulation, destroying the normal function of the muscles, and not only weakening the foot, but laying a foundation for general ill health. A normal and healthy foot is conducive toward raising general body efficiency. An abnormal deformed foot put in an abnormal shoe may not mean discomfort to the wearer under ordinary conditions, but any added strain brought on by changing suddenly to gymnasium shoes, low heels, or walking, standing, climbing, dancing, etc., will soon make the wearer realize that her foot foundation is inadequate.

The action of normal shoes on the muscles of the feet is just the reverse of that of abnormal shoes. The straight inner line of the normal shoe allows the toes to grow straight and to spread, and there are no bunions, corns or callouses. Instead of stretching the muscles which support the arch, the normal shoe pulls the toes toward the median line,—adduction, contracting the muscles and strengthening them. With every step and movement of the foot the muscles are exercised, thus becoming stronger. The heels are low and broad and fit snugly. There is no sliding forward of the foot and no tilting backward of the body, as in abnormal shoes.

It is true that the "common sense" shoe is not dressy to wear outside of business or working hours. When "dressup" time comes, the dressy shoe may be worn without apparent injury to the foot, providing that it is not worn a longer time than the normal shoe; in the latter case all good would be undone.

To "toe ahead," as the Indians do, is a natural characteristic. However, if the foot has been deformed by abnormal shoes and the gait is south by south-east and north by north-east, it requires unremitting and persistent attention to the feet in order to overcome this acquired characteristic and again "toe ahead." It is well to compare the short, stilted and mincing steps caused by the unnatural so-called fashionable shoes, which many of our young girls wear, with the graceful gait of our well poised athletic girl.

When buying a pair of shoes, test them by placing the inner border on a straight line, a crack, counter, etc. If the toe follows the line for the length of the great toe the shoe is normal. (See illustration.) Childrens' shoes, though broad toed, if tested in this manner, will often be found to diverge outward from the point where the base of the great toe would come. Such a shoe would eventually cause the child to walk unnaturally, to toe outward.

The foot weary one should never resort to arch supports or ankle braces without the advice of a competent physician, preferably an orthopedic physician. Such supports act as splints and very often do more harm than good to fallen arches.

Women who are suffering from foot strain should put on properly shaped shoes and keep toeing in all the time. The muscles may be toned up by applying alternate hot and cold water; hot water for ten or fifteen minutes, then cold water for a few seconds. This treatment should be given the feet frequently during the day, especially before retiring. Exercise five minutes night and morning by taking "heel and toe drills," by walking bare-foot in sand or soft clay, by walking on the outer border of the foot, by picking up pebbles or marbles with the toes, by running, or by walking on a straight line.

"Toe ahead" and your feet will not fail you.

Corn Among the Indians of the Upper Missouri

By George F. Will and George E. Hyde. (Little histories of North American Indians, number 5). St. Louis: William Harvey Miner Company. 1917. 323 p. $1.50.

This book is one which is of special interest to the people of our state, both because one of the authors is a resident of the state and because the subject is one which fits in vitally with our early history.

One would get the wrong idea if he thought that this "little history" is one designed for eighth-grade pupils. It is really the result of many years of work, and the materials have been drawn from many sources; moreover, the authors have received the advice and aid of a number of specialists. The work, in fact, is one of such scholarship, that we may well regard it with pride.

The upper Missouri valley is defined as the region along the Missouri, extending from the mouth of the Platte to the Rocky Mountains. The various tribes which settled in this region are enumerated, and their early history is sketched. The fact that these tribes took to agriculture led to their living in permanent villages, and the description of the earth-lodge village is suggestive and interesting. In fact the book may be looked upon as a history of corn as it has entered into the lives and customs of these people.

The technique of the cultivation of corn is given in chapters on planting and cultivation, harvest, and on corn as food. Of course, in comparison with the large corn fields of the whites the corn fields of the Indians seem small, but the authors rightly say that these little fields should be compared rather with areas in the old village system of England or to the patches of the pioneers of our country who lived in the timber.

The fact that the Indians used a great deal of green corn is interesting. They used it not only as roasting-ears, but prepared it in a careful way for storing. The reason for this sort of use was that often the corn was so exposed to ravages of birds or perhaps to incursions of enemies, that it was safer to harvest it before fully ripe. Yet considerable quantities were left to mature. The Indians had many different ways of preparing corn for food, and people of today might well get some hints from these.

One of the most valuable chapters in the book is on corn as an article of trade. This trade was carried on mainly by the Mandans, altho other tribes participated to some extent. The Mandans acted as middlemen between the tribes to the northeast, who were able to get kettles, guns, ammunition and axes from the English traders as far north as Hudson Bay and the plains Indians to the southwest who exchanged robes, meat and horses. The supplies of corn which these Indians were able to sell were of great advantage, also, to white explorers and traders from the time of Verendrye down to the later American fur traders. It is especially noteworthy that Lewis and Clark were greatly aided by the corn supplies of the Mandans and Hidatsas.

The legends and myths which grew out of corn are given at considerable length. The real benefactors in developing corn were, of course, the patient squaws who, by seed selection and careful culture, adapted this semi-tropical plant to the short summers and semi-arid conditions of the Upper Missouri; yet all of the tribes sought for some supernatural origin and had their tales of how some sort of mysterious being had brought the corn. The corn also had to have religious worship of some sort and so rituals were worked out and ceremonies indulged in. These, perhaps, were of some advantage in helping to keep strains pure.

The authors treat the various varieties of corn with the skill of specialists. They say that "similar types of corn were raised over all the parts of the continent where agriculture was practiced, where similar climatic, physical and cultural conditions prevailed."

It is interesting to observe that the Mandan rules for choosing corn seed are very much the same as the requirements of specialists of the present day. It is interesting also to notice that corn was carried even way up into Saskatchewan. This corn was scarcely more than two feet high, contrasting strongly with the tall corn which grew down around Omaha.

William Trimble

CAMPUS AND ALUMNI

A military service bulletin board has been installed at the entrance to the main building. On this board appear the names of all from the college who are in military service. This honor roll is kept up to date as information comes in. One portion of the bulletin board is reserved for items of military news pertaining to the college and those in military service. Material for the bulletin board is received by Registrar Parrott. A service flag, in charge of a committee, is on display.

The return of Gordon W. Randlett and T. A. Hoverstad to the college will be welcome news to their former associates in the state. Mr. Randlett becomes director of agricultural extension, in charge of county agents' work. For the past two years he has served as director of the extension division in the South Dakota Agricultural College. Mr. Hoverstad, who has had much experience in agricultural teaching and in farmers' institute work, has for several years been the agricultural commissioner for the Soo railroad.

An Alumnus in Montana

The following interesting letter was addressed to Walter Baumgartel, secretary of the alumni association and alumni editor.

Chinook, Montana,
Feb. 11, 1918.

My Dear Secretary:

I have just recently returned from our mid-winter county agents' conference at Bozeman and am hard at work again on the job of making Blaine the best county in the state.

Toward the latter part of our conference week we arranged for a North Dakota or rather an A. C. reunion dinner at the Bungalow Cafe. There were eleven of us in all. E. W. Anderson, Dean Mendenhall, Murray Stebbins, Charlie Michels and myself were first on the scene, while J. R. Campbell, Carl Yerrington and Prof. Whitcomb were not far behind. After five or ten minutes Prof. Martin also showed up and we proceeded to show the waitress what hearty appetites North Dakotans possess.

United States Ebner, who was out on a special visit in the interests (?) of the gophers of Montana, was also to have been present. We phoned to all the hotels and other leading public places for Eb, but to no avail. At last the manager of the Bozeman Hotel reported that Ebner had been discovered in a garbage can behind the hotel evidently endeavoring to solve the rodent problems of the country. When finally found he was not long in joining our happy throng, and we must say his numerous jokes added a considerable to the jollity and general high spirits. However, we were sorry that he could not eat with us, as he informed us that he had already dined.

Just a word about each of these old A. C. men and where they are located. Prof. Martin is in charge of the dairy department of the Montana State College. We had the pleasure of drinking some of his buttermilk, so we can vouch for him. Prof. Whitcomb is in the agronomy work, and getting along splendidly. J. R. Campbell is county agent in Missoula and we know he is making a big success, for the apples he had on exhibit at Bozeman tasted fine.

Carl Yerrington is county agent in Custer County and is located at Miles City. His Yellowstone Valley Seed Growers' Association is one of the most successful co-operative organizations in the state. Dean Mendenhall enjoys the distinction of ruling over the largest county in the state, Dawson County. Those who know Dean's ability to "get there" will appreciate that he is well located. We might have visions of Dean financing another special train if it were not for the lamented fact that the railroad went past his county barely going thru one corner. Dean and Carl both enjoy the distinction of being recently married, both having deserted the ranks of bachelorhood last spring.

Charlie Michels must also be classed with the benedicts tho his desertion is of a more recent date. Charlie, better known to his friends as Mike, graduated from A. C. in 1909, took his master's degree at Wisconsin, and has been in South Dakota most of the time since then. He recently came out to Sheridan County to start farming on a big scale, but liked the genial company of the Montana county agents so well that he has decided to cast his lot with us. He is now located in Toole County and lives at Shelby. He says he used to be skinny, but he is quite the reverse now. However, his friends would still recognize him by his genial smile.

Murray Stebbins joined us the first of November and is now firmly entrenched in Valley County with headquarters at Glasgow. We know that he is, for the chairman of the county commissioners, who has still five years to serve, informs us that "as long as he is there they will have a county agent, and as long as they have a county agent they will have Stebbins." Mr. Stebbins, Jr., class mascot in 1917 (now about 4 years old), will likely succeed his father to the throne.

E. W. Anderson of '14 has been here longer than any of us, except probably Campbell. He is located in Sheridan County, one of the biggest Montana empires. Andy is known as the only county agent who has money; he is noted for the wilt-resistant flax grown in his county; and last but not least he is still single. He appears to have developed a sort of immunity or a "resistance" to the charms of the fair Montana damsels. The writer claims the honor of being classed with Andy in that he is still loyal to the rapidly thinning ranks of bachelorhood; but we can't say how long. He is purchasing a large amount of Anderson's wilt-resistant flax for the farmers (?) of Blaine County; but unless he develops some of Andy's immunity there is no telling what may happen.

William Stapleton is the last addition to the N. D. A. C. family in Montana. Stape has been in Minnesota teaching in an agricultural high school, but the lure of the mountains of Montana proved too much for him. We hesitate to tell all we know of him because he claims to be Irish; but we welcome him to our family.

With apologies for the brevity of this letter and the hasty way it is written.

Yours for a stronger alumni
spirit at A. C.
M. A. Thorfinson, '17.

COLLEGE AND STATE

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College Opportunities and Ideals

President Edwin F. Ladd

The supreme purpose of education is to fit all men and women for a larger usefulness in dealing with the problems of life. The institutions first to grasp this bigger and broader vision were the agricultural colleges. It may be safely said that they really typify the American ideal of education, because they are an outgrowth of our own democracy. From year to year they have grown steadily in popular favor until now they are universally recognized as absolutely essential to the upbuilding of any commonwealth. Their value to the community continually increases. An institution which has for its mission the promotion of a "liberal and practical education for the industrial classes in the several pursuits of life" renders an inestimable service to mankind. Perhaps the one really great characteristic of the agricultural college is that it is a Simon-pure American institution. The idea of the "Land Grant College" was conceived in the mind of a man whose father and grandfather were blacksmiths. Justin Morrill, the founder, was an American who came from the industrial classes. The bill which he championed in the halls of congress for the establishment of the agricultural colleges was signed on July 2, 1862, by one of the commonest of common people, Abraham Lincoln.

The North Dakota Agricultural College has always kept these fundamental principles in mind. For over a quarter of a century it has faithfully performed its duty and efficiently served the people of a great state. The institution is particularly fortunate in its organization, because its courses of instruction are so arranged as to afford an opportunity for every class of people in the state to receive a practical education regardless of their previous preparation. The young man or woman with a high school education who wishes to receive a four year collegiate training has the privilege of choosing a career in the following schools—the School of Agriculture, the School of Chemistry and Pharmacy, the School of Education, the School of Home Economics, the School of Mechanic Arts and the School of Veterinary Science. Each school is broad in its scope and equipped with splendid facilities. No efforts are spared to make the work thoro and well worth while. For those who have completed the eighth grade, or one or two years of high school work in a consolidated school, it affords excellent four year courses in the Agricultural and Manual Training High School. In case a person cannot afford the time and money to spend four years at the institution, several Industrial Courses consisting of five months each year for a period of two or three years are given. During the winter months a short course of ten weeks and a Farmers' Course of ten days are offered. From the foregoing, one can readily see that no person, young or old, is excluded from the curricula of the Agricultural College. Its aim is to give the masses a liberal and practical education.

Never in the history of the world have better and brighter opportunities been open to the young men and women trained in the industrial arts. In the period of reconstruction which will inevitably follow the great world conflict, leaders in the varied industries, not only in our own state but in the world at large will be needed in great numbers. The North Dakota Agricultural College is an institution which encourages industrial leadership. Its doors are open to the people, young and old, of the commonwealth of North Dakota.

Young Men and Agriculture

The instruction in agriculture in an agricultural college of the present day is sufficiently exhaustive and varied to fit men for positions in many of the lines associated with the industry of agriculture.

The extent to which agricultural college graduates have succeeded in their own practical agricultural enterprises puts at rest the old time question as to whether or not a farmer needs an education.

Recent surveys have shown that on the average a farmer's success is in proportion to his educational training and it may fairly be said that any farmer who is very successful is either well educated in his calling or is following methods developed by men who are.

Outside of the field of practical agriculture, but closely associated with it, are many lines of work that can be handled only by those especially trained and educated.

Agricultural editors, teachers, extension workers, county agents, and experts in marketing, farm management, agricultural and soil surveys and the various lines of animal husbandry are recruited chiefly from the ranks of agricultural graduates.

The demand for men trained in these various lines is constantly increasing since agriculture itself is forever growing.

With the development of the consolidated rural school and the agricultural high school the time is at hand when those engaged in farming will constitute an educated class. As such they will demand the services of highly trained men to carry out the many enterprises characteristic of an advanced agriculture.

The relation of agricultural colleges to this whole forward movement is obvious, and discriminating young people looking forward to a successful and useful career cannot afford to overlook the opportunity that agricultural colleges offer.

Opportunities—Vocational Education

The school of education prepares teachers of agriculture, mechanic arts, and science, and trains for rural and vocational school administration. The training of vocational teachers under the Smith-Hughes act has been assigned to the North Dakota Agricultural College and suitable courses are offered. The demand for vocational teachers is far beyond the supply. High school graduates should consider the opportunities now offered in the field of vocational teaching. The vocational teacher has a peculiar advantage in having the choice of two careers—as a teacher of a vocation or as one who practices it.

Letters which come to the college regarding teachers are a fair indication of the opportunities in the field of vocational teaching. This year many calls have come in, far more than candidates could be provided for. Home economics teachers have been in great demand. Oftentimes it is desired that home economics teachers take charge of one or more subjects in connection with home economics. Positions for young men as teachers have been numerous. The nature of these positions may be judged from the following quotations from a few of the large number of letters received:

We need a teacher in science and agriculture. The work is as follows: two classes in general science, one class in farm crops, one class in animal husbandry, one class in general agriculture.

—From a city in South Dakota.

Two good men to act as principals of consolidated schools—to supervise an experiment plot, teach agriculture and look after other industrial work which should be taught in modern schools. A teacherage will be furnished. We are willing to pay what is necessary to get good men.

—From a county in North Dakota.

A man to handle iron work, woodwork and a course in farm machinery. $125 a month.

—A college in Kansas.

A man who can teach mechanical drawing and use of a lathe, wood finishing, as well as woodwork and business arithmetic. $900 to $1,000 for nine months.

—A city in Minnesota.

A man to teach the usual agricultural subjects and carry extension work. Salary $1,200 to $1,400 for 12 months, liberal vacations.

—A county seat in Minnesota.

Principal of a two-department rural consolidated school.

—A township in western N. Dak.

Man for agricultural department in one of the five state agricultural high schools in North Dakota. To do extension and county work. Salary $1,500.

A man to take charge of agricultural work and manual training in a North Dakota school. Expected to comply with the conditions necessary to receive federal aid under the Smith-Hughes act. This school has ten acres of land suitable for demonstration purposes.

A teacher of bench work, mechanical drawing and physics. Should be a college graduate.

—A large town in Minnesota.

An agricultural instructor in a high school. Salary $125 per month.

—A Minnesota town.

A man to handle science and athletics in high school. To hold B. S. degree or equivalent. $110 per month.

—A Montana town.

A teacher of agriculture to devote half of his time to extension work. Salary $1,200—$1,500. Also a teacher of manual training with college degree. Salary $100 per month.

—A small city in North Dakota.

Teacher of animal husbandry, horticulture, vegetable gardening and athletic coach. $1,100—$1,300 for 11 months.

—A Minnesota town.

Agriculturist in a county agricultural and training school. $1,400 for experienced man.

A man to teach agriculture under the Smith-Hughes act.

—A small city in Nebraska.

A first class man in agriculture for the coming year at a salary of $1,800 for 12 months with the privilege of one full month's vacation on full pay. He must be able to handle a four-year course in agriculture and must know how to connect his work up with a county 130 miles long by 90 miles wide. He should be a graduate of an agricultural college and have had at least two years experience in high school teaching. He will have to conduct his work under the provisions of the Smith-Hughes act.

—A city in Montana.

Chemistry and Pharmacy

Each year there is an increasing demand for young men trained in chemistry, and to meet this growing demand advanced groups in chemistry are outlined and offered as a continuation of the elementary work of the freshman year as required for the general science curriculum.

It is the aim of the school of chemistry and pharmacy to give to those students who elect courses in chemistry a thoro training in general chemistry; to train the student to observe for himself the phenomena of the science; to think intelligently, and reason with accuracy, as well as to cultivate systematic habits of work and skill in manipulation. Attention is given to training preparatory to the work of agricultural colleges and of agricultural experiment stations. The advanced work in chemistry is designed to give students special training preparatory to the study of medicine and pharmacy; it is for teachers and investigators in chemistry; it also prepares the student for positions in connection with industries based on chemical principles. The elective course in physiological chemistry furnishes a basis for the study of medicine, either veterinary or human, or when taken in connection with domestic science gives training to young ladies who look forward to becoming teachers of domestic science. The future holds great possibilities for industrial chemists in connection with the utilization of straw in paper and paper board making; in the fullest development of the clay working industry; and in the lignite and fuel industry; as well as in paint and varnish industries, and in the sugar beet work.

In chemistry there are six distinct divisions: inorganic and qualitative chemistry, organic and quantitative chemistry, agricultural chemistry, food and physiological chemistry, industrial chemistry, and engineering and chemistry.

Courses in the School of Mechanic Arts

Mechanical engineering is a general course of study that is intended to prepare young men for the profession of mechanical engineering, whose work is principally in lines related to the design, construction and management of machinery.

Civil engineering is a general course that is intended to prepare young men for the profession of civil engineering. This course has to do with a variety of branches such as irrigation, water supply, sanitation, hydraulic and municipal engineering, etc.

Architecture is a course arranged to train students particularly for the practice of general architecture. The greatest attention is directed to the esthetic features of buildings and their surroundings.

Architectural engineering is a second course of this nature in which the greatest attention is devoted to heavy construction, as that of mills, factories, warehouses and other buildings requiring strength and durability rather than architectural beauty.

Power machinery is a course covering three years of six months each. Its object is to train young men for the care and management of power machinery. Engineering short course instruction is given each winter for three months in the care and operation of traction machinery.

Department of Music

What has the department of music to offer students and prospective students of the agricultural college? What does the department stand for and what is its particular function?

There are two dominating ideas running thru the work done here. First, the department aims to furnish the student body, faculty and guests a source of entertainment and enjoyment for all varieties of functions, and, second, a thoro training in the practical rendition of music in its various forms. This order is not named in relative degree of importance because each idea is interwoven in the other and each is of equal importance.

While the members of the department of music give pleasure and assistance to others they reap a benefit themselves. The members of the voice department in chorus or glee club receive instruction in singing, in reading music, and in the art of appearing in public. They learn to know good music from cheap music.

The members of the band and orchestra are taught to play some instrument with others, in tune, in time, with balance and more or less skill. The orchestra members have training in the various kinds of music from the heavy symphony to the lighter popular numbers. They learn the duties of the concert orchestra member,—to play in tune with careful regard to phrasing, time, the watching of the director, and that most important of all study,—concentration. This is all educational in the highest sense and fits the members to go back to their homes ready to take their places in the different musical organizations all over the state.

Besides this ensemble instruction the members of the department have the opportunity to do more advanced work in private with the instructors. Miss Grasse, the head of the voice and piano department, gives private instruction in voice culture and piano. Mr. Henrikson, the instructor in violin, gives lessons on all the stringed instruments and the director of the department, Dr. Putnam, teaches all the wind instruments. The class work in the department, in chorus, glee club, band or orchestra is all free to the students. The private instruction costs but a small extra fee per lesson.

The Field of Home Economics

Curricula in the school of home economics prepare students for the occupations of:

Homemaker.
Teacher.
Extension worker, in boys' and girls' club work, as county agent, as farmers' institute lecturer.
Dietitian.
Institutional manager.
Director of tea-room.
Matron.
Y. W. C. A. secretary.
Philanthropic worker — visiting house-keeper, resident matron.
Dressmaker.

Military Training

Major M. F. Steele

Never before have the importance and value of the department of military training at the state's agricultural college been so apparent as they are now in the midst of the great world struggle in which our nation is engaged.

This department has always been an important adjunct to the college, but its necessity and importance have not heretofore been fully appreciated by all patriotic people as it is today. In fact, back in the piping time of peace there were persons, no doubt, sensible, patriotic citizens, who regarded all military drill and instruction at our colleges as so much of the student's time thrown away. There were others who were positively opposed to such instruction and looked upon it as a recognition and encouragement of militarism, that monstrous abomination of all true Americans.

Many students, therefore, received no encouragement from parents at home in the performance of their military duty at colleges, and they looked upon the military exercises as so much useless drudgery and went thru them without interest, pleasure or profit. But that was all back in the days when there was no thought of war; when we believed that our twenty centuries of Christian civilization and culture had forever crowded the demon of war out of the path of human progress. That time of mistaken belief in the present and blundering faith in the future is all past now. The last three years of blood and carnage have set the world back three centuries in civilization.

No man today can foresee the end of the world conflict. We all hope it may not last many months longer, but we have hoped that for more than three years, and during that time each week of mortal struggle has seemed to put the end farther away. We know that the war department and the government are preparing against several more years of war. The president has told the world in unmistakable terms the only sort of peace we will ever agree to—a peace the kaiser is equally determined we shall not gain. In the words of the president the question of peace is to be decided by force alone, the force of men and arms. And in this grim and iron decision the president has the patriots of America behind him as one man.

Ten million Americans have already registered for the draft and each succeeding year will add a million young men to the list. Already there is talk of an American army of 5,000,000. But where are the commissioned officers to come from—the educated men who are to lead and command these millions of soldiers in battle and campaign? An army of 1,000,000 men requires 50,000 commissioned officers. These officers must be educated men, men who have already acquired or are capable of acquiring in the shortest practicable time the technical knowledge requisite for leadership in the most complex, the most serious, the most deadly business of this twentieth Christian century, the business of modern warfare. The lives of our soldiers, the liberty of our nation, the hope of civilization, the future of the world depend upon the military knowledge of these commissioned officers.

Where is our government to look for men fit to commission as officers in this huge army except to our colleges? Every item of military instruction and training, therefore, that a college youth can get will be to his advantage and the benefit of the government. Already the war department has established officers' training camps to which no civilians are eligible except graduates and students of colleges which maintain a department of military training; and it is likely that none other will be admitted to future training camps. While the war lasts, therefore, it behooves all students to get all the military education and training they can; and at this time it should seem that every able bodied young man who can possibly do so should take a course at a college offering the advantages of military training.

Under an act of congress passed within the last two years the cadet corps of certain colleges in the United States are classified as "divisions of the reserve officers' training corps." The North Dakota Agricultural College is in this select list. Any student at such colleges who takes the full course of military training receives a commission in the officers' reserve corps, which, in case he is called to active service, insures his appointment as a commissioned officer. Moreover, the government furnishes the students at these colleges their uniforms or pays them commutation thereof. At present the government is unable to furnish the uniforms in kind, but pays each student $14.00, which is about half the actual cost of his uniform.

The Veterinary Profession
Its Requirements and Opportunities

The choice of a profession is a difficult task for many young men. It is often a real problem. While there are a few boys who are born with a desire to follow some profession or who grow up under an influence that tends to simplify their choice, the majority of young men have difficulty in deciding what their future work shall be. The larger number of those who enter the so-called learned professions, do so as a result of many deciding influences. In making a decision, their personal adaptability to the profession, the preliminary requirements, their financial circumstances and the opportunities offered by the profession have their influence. The overcrowding of the older professions prevents many from entering them, while the opportunities for scientific attainment and for service in certain of the newer ones are practically unknown to the high school student.

The veterinary profession is among the more recent in America, altho in Europe its history began in the eighteenth century. As it is considered a new profession in this country, its possibilities for service as well as for personal advancement are not generally understood.

The first veterinary college was established at Lyons, France, in 1762. It was at the instance of one Claude Bourgelat that the French government organized a faculty to teach men how to treat the sick and injured horses in the French cavalry. A few years later the government established a second school at Alfort, a suburb of Paris, with the additional purpose of studying the destructive diseases of domesticated animals. Then other countries followed the example of France until now continental Europe has a large number of well equipped veterinary colleges. The school at Hanover is one of the most interesting institutions of learning in Germany. Its spacious and attractive grounds and its numerous and well equipped buildings exemplify the dignity and importance of the veterinary profession. The veterinary schools in Berlin, Dresden, Munich and Hanover illustrate the place veterinary medicine has in the professional life of Germany. The same recognition is accorded it in Italy, Hungary, Belgium, Holland, Denmark, Sweden and Great Britian. All continental European veterinary colleges are supported by the government and none of them are private colleges.

In this country veterinary education began as a private enterprise and there are still a number of private veterinary schools. Cornell University established at its opening, in 1868, a department of veterinary science. Following this example, other institutions, especially the state agricultural colleges and universities, organized similar departments. In 1896, the first state veterinary college was opened. At present, the states of New York, Ohio, Pennsylvania, Colorado, Kansas, Iowa, Washington, Alabama, North Dakota and Michigan support veterinary colleges and the Ontario Veterinary School has been taken over by the provincial government and affiliated with the University of Toronto. These colleges are being carefully organized and in facilities for instruction and scientific methods of teaching they are on a par with the other and older professional state schools.

In this country, veterinary medicine was among the last of the professions to recognize the necessity of preliminary education. Like human medicine, the earlier and private veterinary schools did not require that their students should have had any prescribed preliminary training. The state veterinary colleges, however, demand definite entrance requirements. At present, most of them require a four year high school course, that is, 15 units; and the others demand two or more years of high school work. This has placed the veterinary profession on a higher educational and more scientific plane.

In the curricula of the state schools, the basic sciences, upon which the art of veterinary medicine rests, are given a prominent place. They devote much time to the study of anatomy, chemistry, histology, embryology, physiology, bacteriology, pathology and animal husbandry. These are followed with the practical subjects of medicine, hygiene, and surgery. Experience has shown that men can not be taught successfully the principles underlying the theory and practice of veterinary medicine and surgery without a background of training in the basic sciences. The veterinary student has a wide range of subjects to cover. In addition to the basic sciences, such as chemistry, physics and biology, he has to know the anatomy, physiology and diseases of several species of animals. The veterinarian has to know the causes and methods for the control of the infectious maladies. In fact he must be a sanitarian, as well as one who treats the sick and the injured. There are few, if any, of the other professions that offer a greater variety of technical subjects for study and research or a greater variety of professional activities than that of the veterinarian.

The necessity for a better preliminary education and a more thoro professional training arose with the development of the sciences which explain the nature and treatment of disease. So long as disease was a mystery, it could not be studied intelligently. But when the causes of various diseases became known and the accompanying tissue changes understood, it became necessary for the veterinarian to be versed in many subjects which before that time were unknown. Such subjects as histology, pathology, bacteriology, hygiene and sanitation have, during the last thirty years, become well established sciences. More than this, live stock owners are better educated and they demand that the veterinarians whom they employ shall be scientific as well as practical men. The problems are not alone the successful treatment of sick and injured animals but also the prevention of the further spread of the communicable diseases. The losses in this country from preventable diseases among animals aggregate hundreds of millions of dollars annually. Again the protection of the people against the maladies of animals communicable to man is a service to humanity that the trained veterinarian must perform. The appeal from live stock owners for means or methods to prevent their losses from disease, the warning from sanitarians to protect the human family against the diseases of animals communicable to man and the assurance of the economist that the losses from disease are added directly to the cost of living point to the great value of veterinarians to the country.

The opportunities for the veterinarian are both varied and numerous. There is no other profession that lends itself to a greater variety of occupations. The best opportunities are, of course, in practice. The practitioner comes in contact with the owners of animals to whom he may become a valued adviser. If, however, one does not care for this line of work, the position of "veterinary inspector" in the Bureau of Animal Industry may be attractive.

There are 1066 graduate veterinarians engaged in the bureau work. These men are taken from among those who stand highest on the civil service eligible list. There are 1000 or more veterinarians employed either all or part of their time in state and municipal veterinary work. There are many good positions in teaching and research work in state agricultural and veterinary colleges and experiment stations. There are positions in the army; with private corporations; with cities as municipal meat, food and dairy inspectors; with farmers having large live stock holdings; and each state has a veterinary department which employs from one to many veterinarians in administrative and scientific work.

To summarize, the positions open to veterinarians outside of private practice are:

1. Veterinary inspectors in the United States Bureau of Animal Industry, where the salary begins at $1,400 per year and where promotions are made if appropriations permit, at the rate of $200 every two years until the maximum salary is reached. The average salary is about $1,600. New appointments have been made at the average rate of 112 annually for the last three years.
2. As veterinarians in the United States army, where the salary begins at $1,700 with an increase of 10% each five years of service for twenty years, after which the salary remains stationary.
3. As teachers in veterinary and agricultural colleges and experiment stations, where the salary ranges from $800 to $3,500 per year.
4. As state and municipal veterinarians with salaries ranging from $800 to $4,000 per year.
5. As salaried veterinarians for ranchmen and owners of large live stock holdings, who pay from $1,200 to $3,000 per year.

Practitioners of veterinary medicine make from $1,000 to $10,000 per year according to their ability. and the extent of the live stock in their locality. There are many places that are not supplied with competent practitioners.

The demand for veterinarians in sanitary work is steadily increasing.

In addition it has been shown that young men who contemplate running a live stock farm of their own should be graduate veterinarians as an essential addition to special training in animal husbandry.

The demand in every activity where veterinarians are required is for well trained and efficient men. The enormous losses among the food producing animals from disease have, because of the scarcity of meat and meat products, become a direct tax upon the people. The value of the live stock of the country is estimated at $5,000,000,000. The loss from disease is conservatively placed at 10 per cent. Whoever is able to work out a means for lessening the ravages of disease among animals performs a valuable service to the nation and places himself among those of scientific attainment. One of the most important pieces of research work that has been done in this country was the discovery of the cause and means of dissemination of Texas fever in cattle. This discovery has saved untold thousands of cattle and pointed the way to the means of controlling not only Texas fever in animals but also malaria and yellow fever in man. The lessening of suffering in dumb creation, the prevention of diseases of animals communicable to man and the saving of the millions of dollars worth of animals are tasks of sufficient importance to attract those who wish to render a valuable service to humanity, which is the true purpose of all professions.

—From a publication issued under the auspices of the Association of State and Provincial Veterinary Colleges.

College Life When Work Is Done

Bessie E. Taylor, Department of
Home Economics

What is it in the life of a college student that keeps the heart light, the mind fresh and the spirit cheery; that fills with joy even the hours of work, and that makes of college life a few short years of happiness, and leaves memories never to be forgotten? The answer is not hard to find, for any student will tell you that it is the college fun which casts the magic spell over college days.

At the beginning of the school year at North Dakota Agricultural College the first thing to attract attention on the campus is the parade of green caps which adorn the heads of the freshmen, and the first real fun begins when some of those same green caps are absent from freshmen heads.

Almost before school opens Dacotah Field is the scene of great activity; hard practice is in progress for the lively football games which are shortly to follow. At this season of the year mass meetings of the entire student body are the order of the day; they are noisy affairs but very necessary for on such occasions college yells are practiced and the freshmen learn the "Yellow and the Green." It is only after such an occasion that a freshman begins to feel that he has been initiated into real college life.

One of the most exciting and by far the happiest days of the fall is the day of the big football game when we return from the field victorious with banners waving and the band playing. We are happy tho voiceless, feeling that we have formed the second line of defense for the team and have contributed our bit toward the victory.

By the way, that band which played so spiritedly thruout the game must have been composed of students of long experience; but no, on closer examination it is noticeable that at least half of its members are freshman boys. Just a few short weeks before, some of these veterans were not at all sure which end of a horn was meant to be blown, and now behold! We have a right to be proud of that band.

We cannot mention college activities without having our minds turned immediately to the far famed "Little Country Theatre". Many of the plays produced on this historic stage are written and staged by students. It is here also that students learn how to arrange and manage community programs suitable to North Dakota small towns and neighborhoods. Nor does the Little Country Theater shut up shop during the summer vacation, but rather, a good troupe is organized which starts out over the state on one night stands. These favorite actors and actresses are the envied of all students and rightly so for they return with most interesting narratives of their delightful experiences.

College wouldn't be college without the college festivals and parties in which everyone participates. In the early fall the Y. M. C. A. and the Y. W. C. A. give a series of "Get acquainted" parties which assuredly live up to their name. He is hopeless indeed who can escape good fellowship and downright good fun on such occasions. One of the memorable occasions of the year is the president's reception at which time President and Mrs. Ladd so graciously receive the students in their home, and so delightfully entertain them later in the armory. Later from time to time thruout the year occur the all-college parties and festivals. These occasions have now become established traditions. The festivals are magnificent spectacles which live long in the memories of all A. C. students.

There is one social affair of the year, however, which stands out above all others in the mind of every girl student, and which is the envy of every man on the campus. I am speaking of the annual co-ed prom, which takes place in January. it is one occasion when the absence of men is not even noticed. The costumes worn at this party are strange and wonderful; all nationalities seem to mingle on equal terms, in fact it is not at all out of the ordinary to see a fair French maid dancing with a heathen Chinee, or a lady from Shakespeare being whirled about by Charlie Chaplin. It is indeed an eventful night.

The college dormitry offers many opportunities for those happy associations and friendships so dear to the heart of every college girl. The girls' gymnasium is located in this building and offers opportunity for basket ball and other athletic games. The men have by no means a monopoly of athletic interest at N. D. A. C.

Each year good lectures and entertainments are brought to the college thru a lecture course which is arranged and offered to the students practically free. Here come to our very doors people of world-wide fame. Very happily, the college is situated in a community which appreciates good music and excellent drama. Such attractions as grand opera, the New York Symphony Orchestra, Madame Schumann-Heinck, John McCormack, Mischa-Elman, Maude Adams and many others of equal fame are some of the advantages offered by Fargo to her student population during the school year.

I haven't yet mentioned one half the activities which go to make up college life at N. D. A. C. There is the college weekly paper, edited by students; the student government association; the woman's league; the literary clubs; the commission government; the glee clubs; the college orchestra; the sororities and fraternities. These are all important factors in the making of college life.

Lest the idea gain credence that college is perhaps all play and no work, I must not fail to mention a system that is in operation here called the point system, under which a student may hold only a prescribed number of offices or belong to only a given number of organizations. This influences him to join only those organizations in which he is most interested and to give only a legitimate amount of time to college festivities.

Honor Scholarship

To encourage earnest and scholarly work in the high school of the state the North Dakota Agricultural College has made available to that student in each first class high school who completes his course of study with the highest standings, a scholarship that relieves the holder thereof from all regular tuition and laboratory fees incident to the completion of any one of the four-year curricula offered by the institution. The value of this scholarship varies from $62.50 to $158.50 depending upon the curriculum selected. A student who is eligible to this scholarship should file his application for the benefits thereof before August first following his graduation from the high school. If it is not thus claimed, it then becomes available to the student who graduates with second honors. Applications for these scholarships should be made to the registrar.

Completion of Secondary Training in the Agricultural and Manual Training Model High School

Young people who live in communities where a high school training is not available, or where only a part of such a training is offered, are invited to consider the Agricultural and Manual Training Model High School for the completion of their secondary or high school work.

This high school now offers regular four-year curricula in Agriculture, Domestic Science, General Science, Mechanic Arts and for Rural Teachers. Each curriculum requires the completion of fifteen units and the work is so arranged that any subjects successfully completed in any of the state high schools may generally be accredited at full value. It is the purpose of these curricula to furnish young people with as complete a training for life as is possible in a high school. Enough of the cultural is included in each to furnish an intelligent understanding of the requirements of good citizenship and, at the same time, enough of the vocational is included to give young folks a purpose in life. In these respects especial attention is called to the Rural Teachers' Curriculum. Our state department of education has stated that 1,500 new teachers are required each year to replace those who drop away for want of adequate training, etc.; that for the time being teachers are being brought from other states; that even in some cases special "permits" must still be tolerated, and that it looks to the Agricultural and Manual Training Model High School to complete each year the training of young men and women competent to teach in rural schools.

To parents who must send their children away from home for their high school training the Agricultural and Manual Training Model High School should have particular attractions. The college dormitory makes the expense in the case of young ladies about the same that it would be in a smaller community, but the opportunities afforded for training in the refinements and for broadening one's sympathies and outlook thru daily intimate contact with young folks from varied walks and interests in life are incomparably better. It also provides moral restraints that are superior. The expert teaching staff, the libraries, the wealth of laboratory equipment and the great variety of instruction offered are generally not available in the regular high school, especially in those of the smaller communities.

These are all features that should be determining considerations with parents who must send their young folks away from home for their secondary training, and to such parents the Agricultural and Manual Training Model High School would make its appeal.

COLLEGE AND STATE

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No Unskilled Labor

The mechanical instruction given during the summer months to a group of drafted men at the college represents a widening of technical training which will mean much not only during the war but after. National strength rests largely upon skilled labor, and unskilled labor and undeveloped human resources are a factor of weakness. It is perhaps not too much to hope that the day of unskilled labor will soon end and that everyone will be trained for one or more vocations, trained to be skillful and taught how to employ muscle and mind to the best advantage. Why have any unskilled labor? The answer is largely in the keeping of the institutions that now form a network of educational service over the country—the land-grant colleges, with their ideals of culture with practical preparation for earning an honest living.

Books for the Country

People who live in cities have library advantages. Books are the soul of the past, and a community or individual that is not in touch with sources of information and culture, as represented by libraries, is losing a good deal. One of the problems of social administration for the future is that of placing books within reach of country readers. Why not the county library as well as the city library? The rural mail carrier might readily be brought into library service on the transportation side. There are thousands of young people growing up in the country who need more and better reading than is now within reach, and there are numbers of older people in the country who would eagerly welcome a wider range of reading matter.

English and the Technical Student

A. E. Minard, Head of Department of English

To the serious technical student, whether of agriculture or of home economics, the opportunity to keep his command of English abreast of the rest of his professional preparation is important. To this end the agricultural college in its department of English language and literature provides a year's required work, mainly in composition, for all freshmen, and offers three years of additional work, mainly in standard and current literature, that may be elected. Some of this additional work is indispensable to the students who would qualify to teach agriculture or home economics under the new Smith-Hughes bill, for the framers of the national act have made English a very substantial part of the course which many of the more ambitious students will certainly take. And in making this requirement of a more thoro foundation in English, they have seen what leaders of professional education, such as engineering, have already seen; namely, that if the new professions are to have their proper influence in affairs the new professional students must have a power of expression and a sympathetic knowledge of basic human interests, such as appear in literature, that will command the respect of their class.

In offering this work the agricultural college, while striving to have its work substantial, is not satisfied to have it merely traditional. In matters of composition, of course, it seeks to establish sound habits as a foundation, and to this end the various departments are urged by the rules of the college to take English expression as well as technical information into constant consideration. Knowledge of principles and tools, such as will enable the student to be his own critic and helper in the inevitable emergencies that arise for all writers, is also called for. But the models used are not merely of the ancient sort. Current magazines and other recent publications are studied. And special composition courses, such as that for engineering students and that for students of home economics, bring together by themselves students with the same professional interest in a class where they may study their special problems of expression with recent special texts and with examples of representative writing of the leaders of their profession.

In the literature courses poetry as it is being written today is studied along with that of Milton, Wordsworth, Tennyson and Browning. The drama of the present has a place as well as that of Shakespeare. Strong essays and addresses dealing with living issues as interpreted by leaders of English and American thought are not neglected entirely, for those of Addison, Lamb and Macaulay. Literature is regarded as an interpreter not merely of the life that was but of the life that is and that is coming. In this connection a year's work in philosophy gives the busy technical student a chance to catch a glimpse of the world views that move modern thinkers.

While the work in composition and literature is provided primarily to give the accuracy and skill in speech and writing, and the breadth of sympathy necessary to the strong professional man and woman, English has a growing direct utility to the large number of teachers who go into the high schools. Superintendents constantly require teachers who can combine the teaching of some other subject with that of agriculture or home economics, and English taught for four years in every first class high school is frequently that other subject. Furthermore, an increasing number of superintendents desire at least one teacher of English in their schools who approaches the problem not merely from the esthetic but also from the technical and practical point of view which the work of the agricultural college affords.

Bigger Human Beings

William Trimble, Professor of History and Social Science

There are certain studies which are essential for the career that a man chooses; but often "they lack breadth of view and illuminating contrast." Studies of a general nature are needed in addition.

For broadening one's views and preparing him to function with satisfaction in modern life perhaps no studies equal economics and sociology. They introduce one to a body of technical phrases and definitions without which one cannot intelligently take part in the discussions of the problems of modern life; they teach him how science may be applied to subjects which are in themselves somewhat vague; they open up fields of thought, arouse new ideas and contribute to one's participation in the great stream of human progress.

The illumination of contrast comes in an unequalled degree thru history. With history we must include geography; for events always happened somewhere. The supreme use of history is not to buttress the latest fad in politics, society or economics; too often such an attempt leads to woeful perversion of history. But history seeks simply to know the facts of other times and other peoples. True history transports us out of ourselves to wander in far off scenes. We do not want now to think of seed selection or bridge stresses or food recipes, but to mingle as human beings with the crowds who trod the long and varied avenues of the past. So shall we understand better the humanity of which we are a part.

Not but that we may choose as our point of departure our present interest. Agriculturists may well peruse agrarian history; engineers and chemists, industrial history; home economics students, the history of art. But we are not thus primarily learning farming or engineering or domestic science, but learning a little bit better to be human beings.

I have been greatly interested in some of the reactions of our home economics girls in a course in Greek civilization and art. Here are some quotations from examination papers:

"The Greeks were temperate in all things and believed in living well-rounded lives, missing nothing of true enjoyment and doing their work well."

"If women had not been home to oversee the slaves and prepare the day's work, the men could not have had the freedom for art and gymnastics which certainly developed the race."

"The Venus of Melos—so pure and strong and graceful that it is to me the ideal of a perfect woman."

"The Greek art at its best pictured only that which was noble and uplifting, that which would appeal to the higher nature of man in all ages."

These young ladies found their lives broadened by contact with the ideals of a people removed in time and place. Vocational students in general—engineers, chemists, agriculturists, and teachers of all these subjects—are claiming as their right nowadays opportunity to take cultural subjects along with their special studies.

Training in Biology

The various courses in biology deal with the foundational facts of life. The studies of botany and zoology, bacteriology, physiology, embryology, etc., are therefore in their bearings as broad as life itself. People who take a proper foundational training in their undergraduate courses in these studies are thus particularly well prepared to go forward with life work along professional lines with better success. Under such training they have a better insight into not only their work but the possible activities in social and political life of the people with whom they live.

It has not been the aim of the department of biology to particularly prepare for any one phase of remunerative work but rather to so construct the courses as to allow students to get foundational training. If desired, they may specialize along certain lines to fit themselves for special work. The courses as arranged give a good foundation for teaching, medicine and surgery, and sanitary engineering, experimentation, investigation and college extension work.

The department of biology has to its credit a number of men and women who have completed advanced courses in medical colleges and in this institution and other institutions have met with success, not only in their chosen lines of work but from a monetary standpoint. The department is prepared to furnish teachers or investigators in biological science, bacteriology, zoology, physiology, plant pathology, botany and embryology. Those who do advanced work in plant pathology or in seed investigation, seed analysis and seed inspection, secure, under present conditions, immediate employment at remunerative salaries.

The department of biology prepares students for definite types of life work, gives them the scientific foundation and the practical processes fitted to each line of work. We are prepared to give finished training to zoologists, botanists, histologists, physiologists, anatomists, bacteriologists, embryologists. Private industries and national and state and educational calls give ready employment to any competent person technically trained. The test of employment almost always rests on whether the candidate is willing to work to give himself a thoro grounding in the technique of his subject.

Students who do careful work in the department can readily fit themselves as seed analysts, food, meat or drug inspectors, agronomists, field crop inspectors, experiment station investigators, county agents or high school and college teachers. Representatives are successfully working in all these fields with remunerative employment and positions could be found for many more.

What the Smith-Hughes Act Means

This recent act of congress signalizes the entrance of the federal government into the field of vocational education below college grade. Funds are apportioned to the various states, to be reapportioned to schools for the encouragement and support of instruction in agriculture, the trades and industries and home economics. Federal aid will be given to high schools, agricultural high schools, county agricultural and training schools, consolidated high schools and part time and evening schools. Aid is also given for the training of teachers to offer vocational subjects, and the North Dakota Agricultural College has been designated for the training of vocational teachers.

The federal law then means that in various North Dakota schools below college grade and attended by persons above the age of 14 vocational instruction will be maintained. Such instruction, while serving vocational needs in the various communities, will create a demand for vocational teachers. An increased demand for vocational teachers stimulates in turn the preparation of such instructors, and better instructors result in increased efficiency in the vocational schools. The federal act will prove a strong stimulus to the further organization of vocational courses.

North Dakota will receive this year $15,000 from the federal government toward the maintenance of vocational schools, $5,000 of this being applied to the preparation of teachers. This marks the beginning of a system of vocational instruction backed by the federal government which should greatly extend such training. The state board of education has tentatively apportioned money to the schools under the Smith-Hughes act. Schools maintaining prescribed work in agriculture will receive $700 for this year. For industrial work $800 is allowed, and for home economics $250. The schools designated by the state board of education are:

Walsh County agricultural and training school, Park River, agriculture and industrial work, $1,500.

Benson County agricultural and training school, Maddock, agriculture and industrial work, $1,500.

Grand Forks high school, agriculture and industrial work $1,500.

Bowman high school, agriculture and industrial work, $1,500.

Bismarck high school, industrial work, $800.

Agricultural courses will be maintained by the following schools and each school will receive $700 federal aid this year: Sheldon, Carrington, Noltmeier rural and consolidated school, and Beach.

Home economics courses will be maintained at Mayville, Rugby, Mandan and Dickinson. Each of these schools receives $250 federal aid this year.

The federal aid is to be used to pay additional teachers whose qualifications are described under the Smith-Hughes act.

Vocational Teachers Trained at the N. D. A. C.

For a number of years work for vocational teaching has been offered at the college and many students have availed themselves of the courses presented. Every year strong demands are made upon the senior class for teachers to go into high schools in this and other states. There are never enough teachers of agriculture or mechanic arts and the field for teachers of home economics is always expanding. Young men who go into schools as teachers of agriculture are often drafted as county agents and their successors are sought from this institution. Graduates of the agricultural college have entered service in schools in North Dakota, Minnesota, South Dakota, Montana, Washington, Oregon and other states. Our graduates are teaching in normal schools, colleges, high schools and consolidated schools. A teacher of agriculture in a high school is today charged with important responsibilities, often conducting a demonstration farm and carrying forward extension work. Farmers look to these instructors for advice upon many subjects and sometimes send the agricultural instructor to purchase car loads of stock.

Training Given

The work for the vocational teacher must of necessity be technical and vocational. The prospective teacher of agriculture must know agriculture, but in addition to technical agriculture he must know methods of teaching. He must know how to carry on project work for public school pupils and to supervise school gardens and similar activities. He must be well prepared in the theory and practice of education, for he is not only a specialist in agriculture but an educator of children. Apprentice work in education and observation must be provided so that the graduate who enters teaching will not be a bungling amateur. Moreover, the teacher of vocational subjects must have a broad outlook and be acquainted with related fields of knowledge, such as sociology, economics and academic branches. There is special need that the vocational teacher be a free and correct speaker.

The needs of the vocational teacher are recognized in the program of studies offered for teachers at the North Dakota Agricultural College. One may there prepare to teach home economics, science, mechanic arts, agriculture, or take work looking toward the rural and consolidated schools. High school graduates who are considering what to do next year should by all means write for information regarding courses for vocational teachers offered by the School of Education of the North Dakota Agricultural College.

American Potash

(Abstract of a paper delivered before the North Dakota Academy of Science, May 11, 1918.)

By J. W. Ince

The element potassium is of great importance to agriculture and many industries. Germany has the largest natural deposit of potassium salts at Stassfurt and for many years has controlled the potash market for fertilizers and industrial purposes. The United States instituted surveys and investigations some years before the war to locate, if possible, potash deposits within her own borders and thus become independent of the Prussian government.

Two scientific departments of the American government have worked at this problem, the bureau of soils and the geological survey. Since the German deposits and those in other countries were almost invariably associated with common salt deposits, that was the first avenue of attack by the United States' investigators. The results of those methods were disappointing, however, and recourse was had to the alkali lakes around the region of Western Nebraska. These lakes contain as high as 4 to 14% dissolved salts and the potash (K_2 O) in the dried product is from 16 to 30%. Another large deposit is that located at Searles Lake, Cal. The brine that permeates this deposit contains 4% potassium chloride. The water of Great Salt Lake contains about one-half per cent of potassium which may be recovered from the mother liquor after the common salt is crystallized out. All these brines are evaporated and the residue dried in order to secure the potash.

Kelp or giant seaweed has extracted potash from sea water to such an extent that its ash contains about 30% of this material. The sea weed is harvested by special boats and the material either dried and ground for direct use as fertilizer or treated to secure the ash. Nearly half the value of the kelp is in the by-product iodine. Certain minerals and rocks, as alunite and feldspar, contain between 10 and 20% potash but it is much more difficult to extract this in a form whereby it can be used as a readily available source of potassium for crops and for manufacturing purposes. The processes of extraction usually involve crushing and roasting of the ore with or without added chemical, extracting the soluble potash and crystallizing the potash after evaporation.

Perhaps the most promising outgrowth of the efforts towards potash development is the successful method whereby a recovery is made in the dust escaping from the flues of Portland cement plants. Such a product is already on the market, in which it is claimed there is 16.7% potassium sulphate and 3.3% potassium silicate. Assuming in the light of results already attained that it would be practicable to increase the percentage of potash recovered, the amount would be more than 100,000 tons annually, or nearly one-half the normal consumption of potash in this country.

There has been considerable interest in North Dakota as to whether there are possible sources of potash in our own state. It has been suggested, for example, that Devils Lake might contain considerable of this valuable substance but the water of this lake only has about 1% total solids, which is less than one-third as great as sea water. The analyses of Devils Lake and other natural surface and artesian waters of North Dakota show that the amount of potassium is low, consequently there is little encouragement for those who expected to secure large amounts in this locality.

The progress thus far made in the effort to establish a sufficient supply of potash for the annual requirements of the United States is encouraging, tho it must be acknowledged that there are disappointing features connected with almost every individual source of supply mentioned herewith.

CAMPUS AND ALUMNI

The school year 1918-19 will show a number of changes in our faculty, some of which are due to the ever-increasing demands of the war for trained helpers, and while we are sorry to have them leave us we are proud to see them enter our country's service.

Bessie E. Taylor, B. S., assistant professor of domestic art, has resigned to enter the Vassar training camp for nurses at Poughkeepsie, N. Y., and Ada Meadows, M. S., has been elected to succeed her. Miss Meadows is a native of Ipswich, S. D., graduating from the high school of that place. She was a student for one year at the University of Wisconsin, and later graduated from the University of South Dakota with the degree bachelor of arts. In 1915 Miss Meadows obtained her degree of M. S. from Columbia University. For three years she has been head of the department of domestic art at Miami University, Ohio.

Nola K. Fromme, B. S., of our department of home economics, has resigned to accept a professorship in home economics in the Iowa Teachers College. Adah Lewis, M. S., head of the department of home economics at the state normal school at Springfield, Mo., has been elected to succeed her. Miss Lewis received her B. S. degree from the Kansas State Agricultural College in 1907, and in 1911 received her M. S. degree from the same institution. For one year following her graduation she had charge of the girls' club work in Kansas.

Marie Kammeyer, instructor in physical training, has offered her services to the government, and is at present doing volunteer work in the Massachusetts General Hospital at Boston. Miss Kammeyer is succeeded by Miss Vivian Sell, graduate this past year of the Sargent School of Physical Training. Miss Sell has had some experience as a teacher and comes to us especially well recommended.

Cap E. Miller, M. S., who has been teaching in the economics department in one of the normals in Milwaukee for the past year, has been elected assistant professor of marketing.

Charles G. Carlson, B. S., one of our own graduates, has been elected assistant professor of agricultural education. For the past year Mr. Carlson has been principal of the Noltemier Consolidated School at Valley City.

Dr. C. R. Moulton has been elected professor of physiological chemistry and toxicology. Dr. Moulton is a graduate of the University of Missouri. For the past year he has been on a leave of absence, working with Dr. H. P. Armsby in the department of nutrition at the Pennsylvania State College.

Professor I. W. Smith, formerly assistant professor of mathematics in this institution, has now been made professor of mathematics and head of the department of mathematics.

Hildur Sorensen, B. S., who has been doing post-graduate work in this institution the past year, has been elected instructor in mathematics and is now attending the University of Wisconsin.

Dr. W. J. Trimble, professor of history and social science, has been granted a year's leave of absence for research work, and Dr. H. K. Murphy, a graduate of the University of Wisconsin, has been engaged to fill the vacancy.

O. A. Brewer, principal of the consolidated school at Juanita, has been elected assistant in the college extension division and will take up work with Professor Hollis.

The excavating for the addition to Science Hall is well under way and when completed Science Hall will be one of the best equipped buildings on the campus. It will relieve to a large extent the congested conditions of class rooms and offices. In all probability the building will be completed by the first of the year.

The work of the military camp established at the agricultural college for the training of engineers, carpenters, blacksmiths, telegraphers, etc., is progressing rapidly. Over 225 soldiers are stationed here, and as soon as they have completed their work an additional 250 are expected.

Miss Cecil Yampolosky has been elected assistant botanist and plant pathologist. Miss Yampolosky graduated from Lewis Institute of Chicago and later carried on advanced studies in the University of Wisconsin and Columbia University, and from the latter institution she has her advanced degree.

Dr. Wanda Weinger also has been elected assistant botanist and plant pathologist. Miss Weinger received her B. S. degree from the Oregon Agricultural College in 1915, her M. S. degree from the University of Wisconsin in 1916, and her Ph. D. degree from the University of Chicago in 1918.

Dr. H. L. Kraybill has been elected to succeed Mr. W. L. Stockham as chemist in the experiment station. Dr. Kraybill is a graduate of Pennsylvania State College. He later obtained his M. S. degree and then his Ph. D. from the University of Chicago and for some time he was assistant to Dr. Frear at Pennsylvania State College. He is now engaged in the work of the U. S. Department of Agriculture, Bureau of Plant Industry.

Dr. P. F. Trowbridge has been elected director of the experiment station. Graduating from the University of Michigan, he later obtained his Ph. D. degree from the University of Illinois and then spent one year in the universities of Germany. He had three years of experience in beet sugar chemistry at the University of Illinois and then went to his present position as head of the department of agricultural chemistry and research at the University of Missouri.

Mr. Thomas H. Quigley, who, during the past year has been in charge of instruction in manual training, has resigned to accept a similar appointment with the Florida Agricultural College at Gainesville.

Miss Anna Olson has been appointed to assist in the library. She will devote her time largely to maintaining the files of scientific publications for the experiment station.

In the extension division there have been several changes. Mr. D. W. Frear, for several years executive clerk, has resigned. Mr. E. W. Hall, for a number of years county agent for Williams County, has been appointed assistant county leader and Mr. Edwin Mayland has been promoted to farm management demonstrator. Mr. A. C. Dahlberg has been appointed specialist in creamery extension, and Mr. J. D. Parkman has been selected as the county agent for Kidder County.

COLLEGE AND STATE

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Agriculture in a Minnesota High School

Norman C. Risjord, '16

I doubt if my experience as an instructor of agriculture in a Minnesota High School (Lanesboro) is any different than it would be in North Dakota. In Minnesota one will find more diversified farming than in North Dakota, due possibly to the higher priced land and smaller farms. This I believe gives one a wider field for general extension work, which includes orcharding, gardening, selecting and feeding of pure bred live stock, drainage, boys and girls club work, crops, especially corn, and general organization work, which includes shipping associations and farmers' clubs.

I find that in selecting subjects for high school classes one must choose subjects that will fit in with local conditions; for example, if you have a pure bred live stock center, as we have, then give a course in animal husbandry, taking your class out say once or twice a week and giving them practical work with live stock, as judging and selection of good stock. The same can be done with the cereals.

If possible all schools having an agricultural department should have at least an acre of ground. We are fortunate in having three acres. Two acres of this is seeded to alfalfa as a demonstration plot, and the remaining acre is divided up among the school children as a school garden. Before the school children are given a plot they must promise to live up to the rules I set forth, some of which are—cost of all seed put in, numbers of hours they work from planting till their products are harvested, amount of seed used and varieties, the time the seed comes thru the ground, when, number of, and what plants are used first.

The garden being plowed deep in the fall, the first thing in the spring is to harrow it several times. Then I have the pupils measure out their respective plots, paying particular attention to straight lines and even-sized plots. The planting is usually done after school hours or on Saturdays under my supervision, which I find is essential if you wish to have a neat appearing garden. In the fall we hold a community fair in the gymnasium of the high school, prizes being given by the banks and other business places. I also have several pig and corn clubs in the country and they bring in their products to this fair. Judges are secured and the winners take their products to the county fair to compete with boys and girls thruout the county. Talks are given by extension men and myself on corn, pigs and garden work. I have found that outside of the benefits the children derive from the work it is bringing about a better feeling and closer co-operation of business men and the farmers.

We have organized a live stock shipping association which has done thousands of dollars worth of business. Outside of this I have succeeded in organizing six farmers' clubs. I feel that if an instructor of agriculture wishes to do some good for his community and at the same time get acquainted he should organize farmers' clubs. They are sorely needed. A live farmers' club is to the community what a wide awake commercial club is to a city. The first thing I do is to get several of the wide awake farmers in a community interested. They in turn talk to their neighbors and a meeting is usually called on a Friday or Saturday night at some farm home. A little patriotic music is the first thing on the program. Music I have found is "soothing" and has its effect upon the most skeptical individual, and not only that, but it is a stimulant to the crowd in general, filling them with enthusiasm. A little talk on farmers' clubs by some of the progressive farmers and myself and we soon have a club organized. Meetings are held usually every two weeks at some farm home. I usually assist in making up programs, getting pupils as well as teachers from the high school to aid on the programs. By so doing I find that it helps our high school, by bringing pupils from the country. In one of our clubs we have a six-piece orchestra. All programs are published in the local paper a week before the meeting. The following is an announcement of one of our programs:—

The regular meeting of the Lanesboro Farmers Club will be held at the home of Ed. Scanlon on Friday, March 7th, at 8 p. m. The following program will be given:—

Selection ....Club Orchestra
Roll Call.........Tell a Humorous Story
Dialogue ....Club Members
Plumbing in the Farm House..T. Bell
Farm Household Conveniences ....Mrs. C. H. Johns
Gardening ....N. C. Risjord
Selection .... Orchestra
Club Booster (Paper)................ .... A. Abrahamson

Topics that are "fitting" for the season are discussed at the meetings. In January we had a joint meeting of the clubs. This was held in the Lanesboro opera house. Different forms of taxation and the income tax were thoroly discussed. It was also decided to hold a joint picnic in June, inviting all farmers' clubs in the county to be present.

There is no limit to the amount of work an agricultural instructor can do for a community, and especially during the present crisis. There is no end to the amount of demonstration work that can be done; not only out in the field but in the school room as well. Stock, smut, alfalfa, and corn demonstrations are the ones we are trying to carry on. I believe the agricultural instructor that lives only in the school room should vacate and make room for some one else.

At the present time, assisted by the superintendent and the teachers, we are pushing food conservation and increased wheat acreage hard. Literature is handed out to the school children both in town and country, as well as at our farmers' clubs. We have an associated school three miles from town that helps us a great deal in this respect, by bringing facts home to parents.

That the graduates of the good old N. D. A. C. can make a showing in Minnesota is without a question, but to do this in as old a state as Minnesota requires a good deal of community work. We cannot and especially at this time be "gentlemen farmers," which puts me in mind of little Johnny, one of the inquisitive sort, who asked his father the following question, "Father, what are gentlemen farmers?" "Gentlemen farmers, my boy, are men that seldom raise anything but their hats,'' replied his father. We as agricultural instructors must help raise more than our hats if we are to crush Prussian militarism.

A Year of the Polytechnic

The Polytechnic Society is an important factor at the college. This society has now closed its 10th year. Meetings are held on alternate Wednesdays at eight in the evening, in the physics lecture room of the engineering building. Scientific papers are presented and discussion follows. The program for the past year has been a strong one, with subjects and speakers as follows:

A general discussion opened by E. F. Ladd, president Agricultural College.

Problems in Compiling North Dakota History, E. G. Meinzer, Agricultural College.

A Review of Some Crop Plants Imported by the U. S. Department of Agriculture, O. O. Churchill, Agricultural College.

History of the Development of Therapeutic Agents, C. P. Guthrie, Agricultural College.

Utilization of Dairy By-Products, J. R. Keithley, Agricultural College.

The Objects and Methods of Agricultural Extension, T. P. Cooper, Experiment Station.

The Work of Luther Burbank (illustrated), C. A. Ballard, Moorhead Normal.

Animal Calorimeters and their Uses, F. W. Christensen, Agricultural College.

The Castes of India, G. F. Henry, Fargo College.

Eradication of a Virulent, Infectious Plant Disease: Citrus Canker (illustrated), E. S. Reynolds, Agricultural College.

The Use of Surveys in Reorganizing Courses of Study, A. D. Weeks, Agricultural College.

The Development of Sanitation as a Science, Roberts Hulbert and Miss Nola Fromme, Agricultural College.

The Possibilities of Artificial Ice for Fargo, R. M. Dolve, Agricultural College.

Methods of Milling the Cereals, W. L. Stockham, Experiment Station.

The Expansion Process and the World Conflict, W. J. Trimble, Agricultural College.

Vocational Training in the North Dakota Agricultural College

Training Detachment

Dean E. S. Keene, Director

When it was proposed by the war department to train at one time 90,000 men to undertake every form of mechanical construction, its management and repair, and to train these men in 60 days to do the work of expert mechanics, mechanical training took on unaccustomed form. Here was an unheard-of proposal but it had to be done; wars are won by the people who do unusual things. The way to accomplish anything new is to make an honest effort toward its accomplishment and then correct any mistakes that may have been made in the first trial.

When the college signed a contract in the last days of May with the war department in which it agreed to take 200 men to begin training in three weeks, it was necessary to make in that time all the required arrangements of shops, laboratories and materials for instruction as well as to formulate schemes for imparting the instruction. In our contract we had agreed to train men in auto-mechanics and truck driving, in forging, carpentry, concrete construction and radio telegraphy. In each of these courses the scheme of instruction must be prepared to suit the work it was possible to undertake. All arrangements must be complete so that two hundred men could begin work when they arrived. In this preparation it was necessary not only to acquire and install additional apparatus but to construct a new building for an auto shop and at the time of beginning instruction the workmen completed finishing the interior in the midst of the various types of auto repair and gas engine investigation.

The men began to arrive on the evening of June 14th, just three days after commencement, and were taken in charge by the military officers who had been sent to receive them. The armory had become a barracks, Ceres Hall contained the mess quarters, the athletic field was the drill ground. The newly arrived soldier mechanics looked anything but soldierly but they also were to take on speed in military preparation. The work of registration, assignment of quarters and a nodding introduction to the most common military observances were soon over, whereupon the farmer, business man and lawyer of last week were doing "setting up" exercises and military drill, learning to salute, and to answer "Sir" when addressed by an officer.

The men had been classified according to choice of courses or assigned by previous experience, and at 7:50 Tuesday morning, June 17th, they answered to bugle call and at 8:00 were ready for work. The hours observed for vocational instruction and military drill were:

First call 5:45
Breakfast 6:15
Physical drill 7:00
Vocational training 8:00-12:00
Dinner 12:10
Vocational training 1:30-3:30
Drill 3:50-6:00
Supper 6:15
Taps 10:00

The form of instruction, as suggested by the committee at Washington under which all vocational training is directed, was to be by example, by precept, and in the performance of actual work. No lessons were to be assigned, no recitations to be made, no text books were to be used. The men were to be instructed as to certain tasks to be performed and explanation made as to the manner of procedure. At the end of the day each man was to record in a log book the things accomplished and that which he had learned. This book was a combined diary and a note book to be turned in to the instructors once each week for inspection. The instructor might question each man as to his understanding of the work done or explain an intricate process. He might describe mechanism or principles, but there was to be no recitation from books.

Each course of training was arranged to suit its manner of application, the carpenters were to build, and they did—sheds, shops, garages, and at the present time are at work on a barracks that is intended to form a place of abode for 400 soldiers. The class in concrete construction built foundations, walks, culvert sections, building blocks, silo staves, walls, bridges and learned the methods of construction by actual contact on the work or in the factory and by observing things of a similar nature that were on a scale larger than could be attempted by them. Each vocation in its own way was made to include as much of actual work as was possible to undertake. The men in auto and truck driving must be trained, not only in actual driving but in all of the mechanism of the cars. The instruction must include the details and principles of operation of the magneto, the lighting and starting apparatus, the storage battery, the transmission, the carburetor, as well as the construction of the chassis. One lost screw or broken bolt may stop the entire machine; it is therefore important that any auto driver should be auto mechanic and be able to make repairs on the road. The instruction in auto and driving was arranged in five departments: 1—that of magnetos together with lighting and starting apparatus; 2—batteries and ignition; 3—carburetors; 4—motive power; 5—the chassis, which includes all mechanism of transmission. Beyond this is the work of actual repair of machines and driving.

In this work where so many appliances are used that are intricate in construction and whose principles of operation require careful investigation, reference books are employed. In the laboratory the references and the actual apparatus are used together. All study is made by actual example.

In order that each man may come in contact with every part of the auto mechanism the class is separated into squads and each squad into divisions; our unit is three men. Each unit works together as a part of the squad. During the first half of the course the squads are rotated thru the departments in periods of three days, the five departments requiring 15 days for a complete cycle. In the future our plan will be to permit each squad to make two complete rounds of the departments and then by selection retain men in the various departments for 15 or more days in order to produce experts. In battery or magneto work the men best suited to further instruction in these types of apparatus will spend the greater part of their time in special preparation.

The practice in driving is a separate division. The object of this course is to teach the men to drive trucks and keep them going under the most difficult service. To drive an automobile is simple compared with the management of a truck. The army truck—of which we have three—is the same as those in use at the front. These monsters that move about with as much apparent power as might some huge gray mastodon are vastly different from a "flivver." To manage an army truck on a bad road is a real job. The demand for trucks is so great that only a few can be furnished to each detachment. On this account they are required by the government to be in use at least nine hours a day. Night driving is a regular duty, and when seen away from the college campus they are performing a regular part of the soldier's training.

The demand for radio telegraphers seems to be without end. Telegraphy includes not only wireless transmission of messages but signaling to suit any emergency. Aside from wireless our classes attempt signaling with flags, by the semaphore and by the wigwag systems; and use the blinker and Ardois systems for night practice. The latter is a system of white and colored lamps that can be used to advantage under certain conditions. The large aerial cannot be used in time of war, so the operators practice with small field sets to attain proficiency in the use of apparatus. In the practice of sending and receiving, a special form of apparatus is used that imitates the actual conditions perfectly but makes no outward sound. The first detachment included 20 radio operators. In the second detachment the number was increased to 30 men. The future classes will be increased to 100 operators and will require for practice alone half of the third floor of the engineering building.

The army blacksmith is called upon to set up his forge anywhere, at any time, and to forge anything that is made of iron and steel. His work is invaluable and the need for such workmen has not yet been satisfied. The college forge shop supplies facilities for the training of forty men at one time. The regular instruction includes all ordinary processes used in army requirements. In this shop has many times been demonstrated that men from any condition of life may be converted into useful army blacksmiths in 60 days time.

The first detachment contained originally 206 men, who were employed in five branches of vocational instruction. After the work had been two weeks in progress, the committee at Washington requested that a class of 20 horseshoers be added. On account of the automobile, horseshoeing had declined to a point where there was no incentive for men to learn that trade; as a result the demand for horseshoers could not at first be satisfied. Those in authority had not forgotten that:

"For the want of a nail the shoe
was lost,
For the want of a shoe the horse
was lost,
For the want of a horse the rider
was lost,
For the want of a rider the battle
was lost,
For the want of the battle a kingdom
was lost,
And all on account of a horseshoe
nail."

Twenty men were sent from Indiana to take up this work and the first detachment was thus increased to 226 men.

Our first detachment completed its training and departed to eight different camps August 14th. The men have since been heard from in various lines of duty. Many reports have come back of their work and up to the present our men have shown themselves as fully abreast with others in their line.

The success of this first trial of the new plan has warranted a still greater and more extended trial of intensive training. The government has provided means by which young men who have completed the grades of the common school and are 18 years or above and those who are high school graduates may undertake special training for the army. Changes have been made in courses of college instruction which will make it possible for all men in position to take advantage of the conditions, to take subjects in engineering, chemistry and science which will best fit them for army service. Such men as are suited for these branches of training may be advanced to camps for additional instruction that may lead to official appointment.

In the future all army educational training will be included in the student army training corps—the S. A. T. C. The technical training to which will be admitted those who have 13 or more high school units will be known as section A. The vocational courses will constitute section B. The students of section A began registration October 1st with the college registrar. This registration will continue until October 20th and possibly until November 1st. All students who are thus regularly enrolled will be inducted into service, whereupon they will become at once student soldiers of the United States army. The men thus inducted will be under military discipline, provided with housing, food, uniform, medical attendance, instruction and pay as a private. Eventually the men will be graded accorded to fitness for the various branches of military duty and transferred to officers training camps.

All men who have finished the 8th grade and were registered prior to September 12 may enroll in section B of the S. A. T. C. In this training the men are trained in vocations that find usefulness in the maintenance of the army. The training periods are of 60 days duration, in which time those suited to the work undertaken are given sufficient instruction to fit them as expert mechanics, journeymen or apprentices. At the end of the period they are graded and sent for further instruction to military camps. These men are tested and graded from time to time and those showing proficiency may be advanced to the technical group or recommended for officers training camps.

Those men in section B who show proficiency and the qualifications of officers may be recommended for transfer to section A, or to officers training. They are under the same military instruction and all conditions of maintenance and pay are the same as the men of section A.

The students army training corps offers an exceptional opportunity for advancement to those who are qualified. No such undertaking has ever before been attempted. In this the government offers to care for and pay a fair wage to those who are in position to receive the training required of officers and skilled workmen. The training, tho severe, is not beyond reason and the benefit to be derived ought to be attractive to every ambitious young man.

The Presence of Prussic Acid in Flax

J. W. Ince, Agricultural Chemist,
North Dakota Experimental Station

In the spring of 1911 about two score cattle were killed in this state by eating flax straw and screenings of the 1910 crop. While this was the first instance that flax was known to be the direct cause of the loss of stock in North Dakota it was by no means an uncommon incident in the flax growing countries of Europe. It would seem strange, perhaps, that no previous case of poisoning should have been reported in this state where so much flax has been grown and fed but the proper combination of conditions for causing such an eventuality was without doubt never before consummated, or possibly the poisoning, if it did occur, was ascribed to some other factor. More cases of fatal poisoning of cattle by flax have been reported in the fall of the year 1917. The repetition of this event and the comparative infrequency with which it occurs would suggest the desirability of trying to correlate its occurrence with the different factors of plant growth in order to understand more thoroly the liability of future recurrences.

The character of the poisonous principle in flax had been ascertained in 1891 by Belgian investigators to be a cyanogenetic glucoside, that is, a chemical compound which liberates hydrocyanic acid when brought in contact with water and an acid or an enzyme capable of decomposing it. This same poison, called linamarin, has been identified with the material phaseolunatin, of wild lima beans and other closely related beans, such as the Burma bean, which was of such interest in this county a while ago. Ten similar cyanogenetic glucosides have been found in more than 200 plants, notable examples being bitter almonds, the kernels of the peach, plum and cherry, and the leaves of the common red currant, the chokecherry and the wild black cherry. The wide distribution of cyanogenetic glucosides and the possibility of finding still other plants containing them would seem to indicate that their common principle, hydrocyanic or prussic acid, exercised some function in the nutrition of the plant. Certain investigators have shown that it is the first recognized product in the assimilation of nitrogen in plants and probably occupies an intermediate position between the nitrates taken up from the soil and proteins.

The three crops, flax, sorghum and Kafir corn, all of which are fed to stock, have been shown to contain generous amounts of hydrocyanic acid. In a general way they all resemble each other in that the amount of the poison varies with the stage of maturity of the plant, the part of the plant and the variety. In each case, under normal conditions, the poison decreases in quantity as the plant nears maturity. If, however, the crop is adversely affected by external conditions the normal plant metabolism may be disorganized and the poison may not decrease as the season progresses. It is doubtful whether the soil has a great influence upon the quantity of poison in the plant, considering experimental evidence upon this point. But it is reasonable to suppose that the climatological conditions of rainfall and temperature would affect the amount of poison, at least indirectly, by being the controlling factor in the growth of the plant for a particular season. Now 1910 was the driest season up to that time of which there was a record in the history of the state, the average rainfall for the growing period being only nine inches. 1917 is of such recent date that it is hardly necessary to recall the fact that it was a very dry season, even more so than 1910, with a rainfall for the growing period of seven and two-thirds inches. Moreover, both years were quite similar in regard to unfavorable temperature conditions. The beginning of the season was cold and frequent frosts made vegetation backward. In the middle of the season the weather suddenly changed to a very high temperature accompanied by hot dry winds. Later, low temperatures again predominated and frosts were unseasonably early. In other words, plant growth was quite abnormal in both these years, any growth that was made being slow and stunted because of an insufficient supply of moisture and too low a temperature. Thus there was a constant demand made by the plant upon its reserve energy, the metabolic changes within the plant were deranged and the plant did not grow normally towards its goal of maturity. The effect of the sudden shortening of the growth of a plant can easily be seen to involve an arresting of plant metabolism and the consequent presence of certain plant products in larger quantity than would normally occur. Naturally in the case of plants developing cyanogenetic glucosides in the early part of the plant's growth there would be an excess of prussic acid available.

These considerations of flax and the climatic factors of these two years seem reasonable, therefore, in searching for the reason of the recurrence of fatal results in feeding flax. There are similar incidents that have happened in other states with regard to sorghum and Kafir which support this argument. Inadequate rainfall and low temperatures (including frosts) have been definitely shown to cause a high percent of hydrocyanic acid and consequent fatal results to cattle fed such plants. This has been found to be true of the states between Minnesota and Oklahoma. Moreover, in North Dakota the reported cases of flax poisoning in 1910 came from the eastern-central and northeastern parts of the state, which the weather records show were the driest for that season. In 1917, however, all cases so far reported have come from the southwestern corner of the state where the drouth was unusually severe.

The lesson to be learned from these experiences is that it is necessary to use extreme caution in feeding flax to stock, especially that grown in a cold dry season. There is no doubt of the fact that prussic acid is present at all stages of growth of this crop but it is especially abundant in young and immature flax, in second growth, and in stunted and frosted plants. Therefore, if one must pasture stock upon the crop, it is advisable to test the material first by feeding an animal of little value so that the loss, if any, will not be large. A green color and a bitter flavor are rough tests for the presence of the poison.

Campus and Alumni

The new addition to Science Hall measures 65½ x 90, four floors. It provides twelve class rooms, several offices, space for a geological laboratory, a large geological museum, and on the fourth floor will be found a large well lighted room to be used as a general college museum. Mechanical ventilation is included in the equipment of this building. An alumnus of the college, Mr. B. F. Meinecke, '99, has the contract for the construction of this addition.

COLLEGE AND STATE

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North Dakota Boys' and Girls' Club Work

Louise Fitzgerald, Assistant State Club Leader

Boys' and girls' club work is a distinctly American type of education which has been developed during the past eight years. It is an education which is bringing the interests of the home and school, and consequently of the entire community closer together. Boys and girls everywhere, in rural communities, in villages, and in the largest cities, have become interested in practical agricultural and home-making projects, which are giving them valuable training and at the same time yielding a financial return. Club work is a vitalized education which interested 840,000 boys and girls in 1917. The exact figures for 1918 are not yet available, but it is safely estimated that a million and a half young people between the ages of ten and eighteen were enrolled in this work during the past year. In 1917 the total value of products produced by all members completing was $3,681,329. The total cost of production was $1,288,675. The average cost of supervision per club member was only $.74.

In North Dakota, as in the other states, the work is carried on thru the extension division of the agricultural college, cooperating with the U. S. department of agriculture. The work in this state, as is the case everywhere, has been very closely coordinated with the public schools, and much of the success and permanency of club organizations has been due to the splendid cooperation given by county superintendents of schools and city school principals.

The work is well established in many counties of the state and has shown a phenomenal growth in the last year. Three assistant state leaders are at work over the state at large; two leaders are in charge of the work in districts, that is, territory comprising more than one county. In addition there are seven counties where the work has grown to such an extent that it requires the full time of a county club leader, and there are two leaders in charge of the work in cities. Before July first we had no financial assistance from counties or districts, but to date five counties have appropriated money to defray the expenses of the club leaders, and in others we have cooperative financial arrangements with the county superintendent's office.

The boys and girls are organized into local club groups, under the direction of a local adult leader, for the performance of a definite farm, garden, or farm home enterprise. These local groups are in turn federated with the county, state and national organizations. Each club by satisfying twelve definite requirements, becomes a standard club, and in recognition a club that meets these requirements is issued an attractive standard club charter by the department of agriculture. North Dakota has 208 standard clubs.

Printed instructions prepared by specialists are furnished to the clubs, and in consequence the fundamentals of the best methods in agriculture and home economics are taught to the young people in an interesting way. This year we called our clubs "Win the War" food clubs, and the opportunity of patriotic service together with the interest in club work stimulated 10,000 boys and girls of the state to become club members and assist their country as producers and conservers of food products.

We promote ten state club projects or definitely outlined pieces of work from which the member can choose. These projects are: feeding and caring for two pigs 150 days; hatching and rearing two settings pure bred chicks; feeding a calf for 150 days; feeding and caring for two lambs 150 days; canning 30 quarts vegetables; growing two square rods of garden; raising one acre of corn; raising one-eighth acre of potatoes; completing three lessons in sewing; making twelve bakings of bread.

The size of plot production requirements and other rules differ depending on the project, but in general the club member when enrolling must agree to attend club meetings, keep a record and write a story of the work performed. He must make an exhibit of his work and help to advance the work in his community in every way possible.

In order for members to fulfill these requirements they need the assistance and helpful interest of the older people. We are happy to say that we have that assistance in North Dakota. A few specific instances will illustrate what that means both to the boys and girls and to the community.

In Grand Forks County the farmers became interested in raising sheep, both because of the good financial return and the threatened shortage of live stock and wool. They decided to get the boys and girls of one community interested, so the Hegton Township Boys' and Girls' Club was chosen. It costs money to start a livestock project, and oftentimes the initial cost so discourages boys and girls that they never commence the project. To remedy this these progressive farmers thru the farm bureau decided to finance the club members, and paid out $1,026 to furnish 35 boys and girls with two bred ewes apiece. In some cases the sheep were pure bred, but all were good grade stock. Notes of the boys and girls were taken in lieu of payment. Every one of the club members is going to make enough above cost of care and feeding to meet his note this year, besides having several fine animals to start his flock. In addition they have learned how to care for their animals, they have done their work on a business basis the same as adults do, and they have demonstrated that it is not only practicable but profitable to raise sheep. Already plans are being made to carry the work on more extensively next year. Three farmers in different parts of the county are anxious to furnish ewes to the boys and girls doing organized club work according to the plan followed this year.

Some splendid records have been made by the boys' and girls' garden clubs. Each club member in this project cultivated a garden at least two square rods in size. Over 5000 young people of the state were enrolled in garden clubs. James Kadlec, a boy twelve years old, of Pisek, up in Walsh County, raised a garden 130x50 feet, containing fifteen kinds of vegetables at a total cost of $28.45. This total included all expenses of plowing, seeding, gathering, rent of land, cost of fertilizer and value of his own time. The value of fresh vegetables, seed saved and vegetables stored was $136, making a profit of $107.55. Surely that is a splendid record for a twelve year old boy's summer work, and a worth while achievement for anyone to have made. There are very few older people that can make out financial records of their work as well as most club members do. Teaching young people this alone makes club work worth while.

This year for the first time Fargo boys and girls carried on this work. There were about 180 garden club members enrolled who raised gardens, under the direction of a city club leader. A special booth in the city market was reserved for club members and many of them took advantage of this opportunity to sell some of their products. One eleven year old boy during the summer used a small express wagon and had his regular customers. In this way he sold $125 worth of vegetables.

In the final reports which are sent in at the close of the season we require the boys and girls to write a story. The narratives are nearly always excellent, and indicate that every boy and girl that does club work gains a great deal of information. They learn to know nature and how to eradicate pests which injure their plots, or agencies that damage their crops.

Thelma Young, of Pierce County, relates the following interesting bit of information, which illustrates how resourceful and observing the average club member is. "On June 27th we had a terrible sand storm. The wind was in the west and it blew the sand across papa's garden and mine. We hardly knew what to do, for the sand and wind together were just destroying the small plants and cutting the larger ones. We went down and began cultivating, which helped some, then we noticed wherever there was a twig, stick or weed near a plant it sent the sand over. We got the idea of forming a windbreak to save the gardens, and got busy pulling all the weeds we could find. There were a lot of horse weeds just outside the garden along the edge of the grove, and you may be sure we pulled and piled weeds along the rows as fast as we could. We got it all fixed so that not much was lost except the tomatoes were set back and were late ripening."

The members have all kinds of obstacles to overcome, and many times the way that they tell about them is very amusing. One little girl says, "My trouble was that a cow got in one night and ate my cabbage, corn and beets and tramped down the tomatoes and couldn't overcome it. I had pretty good experience for the first time. My success was that I learned something about a garden and my failure was that the cow got in."

During state fair week at Fargo the Fargo "Win the War" garden clubs staged three demonstrations a day on canning. They had a special booth, which was filled with exhibits in various projects, sent in by club members from all parts of the state. The booth and the team work of the club members attracted a great deal of interest and many of the fair visitors returned to the booth to attend the demonstrations and see the different vegetables canned. As the fair comes in July it was a bit early in the season for mature products, but the quality of exhibits compared very favorably with those of adult exhibitors. This fair and almost all other fairs awarded their premiums in thrift stamps to club members.

Considerable attention has been paid to developing demonstration teams in the club projects, so that the demonstration team of three members can show in a practical, effective way different phases of their club activities. We want every demonstration team to give at least one demonstration in the home community, and some of the leaders schedule the teams for club meetings or farmers' meetings in other parts of their counties.

We have had great success with canning teams this year. A series of county "canning meets" was held in thirteen counties, and fifty-nine teams competed for honors. These contests were conducted to choose championship county and state teams. The state team, which came from Mott, represented North Dakota at the interstate fair, held at Sioux City, Iowa, in September. At this fair the state champion teams of ten middle western states competed for honors. Nebraska carried away the championship banner, but with the fine interest that has been shown our second year canning team work should prove even more successful than this year.

In canning, the club members use the one period cold pack method, which has been developed by the national leader of boys' and girls' clubs, Mr. O. H. Benson. Canning appeals to members as one of the best ways of conserving food and "helping to win the world war."

Our requirement in this project is that each member must can at least thirty quarts of vegetables. Members are not stopping at the minimum, however, but are striving to see how much food they can store away. We estimate that club members of the state have canned 50,000 quarts of products for home use. One girl in Sargent County reports 463 quarts canned. At last report a boy in Grant County had canned over 500 quarts and still had tomatoes to can. Boys can beat the girls when it comes to canning.

Club members don't just "put up" products, tho; they grade uniformly and have a definite system of packing in the jars which gives each jar a uniform standard appearance. In the east and south where there is a market for surplus products, club members sell their canned stuff under a uniform label. Wherever you see the 4-H, or club label, on canned products, seed corn or whatever it may be, you know it is a quality product, produced by a club member.

A girl in Benson County, who reports a profit of $56.92 on her canning project, says, "During my entire vacation I stayed at home and canned instead of spending part of my time visiting friends. I enjoyed my vacation more than ever before because in this way I was really doing something to help win the war, as I had to undergo a sacrifice in doing it."

It is interesting to note the use that club members make of the profits from their projects. Most of them have invested at least a part of it in thrift stamps, and some have made enough to buy liberty bonds. Some club groups have pledged themselves to donate one-tenth of their profits to the Red Cross, and the leaders report that many have joined the "Victory Boys and Girls" in the united war drive, and are paying their quota from profits of their season's club work. The following report of the activities of one club in Ward County is significant of the spirit existing among club members to assist in war activities.

"The Sawyer sewing club of eleven members have knit 39 pairs of socks for the Red Cross. They also have made ten comfort bags and sewing kits, which they filled and donated to the Red Cross. It costs about $2.05

to fill each bag in addition to the cost of the material required for making the bags. The boys' and girls' club gave an ice cream social, the proceeds being $21.61. This money was used to buy the necessary articles to put into the bags."

As a proper closing for the year's club work, each group holds its local fair and exhibit of products. This is called the club achievement day, and is the completion day in the year's club work when the members meet together to celebrate, and to talk over the achievements that they have made during the year.

As with all other public meetings, our achievement days this year have been seriously interfered with by the influenza epidemic. Twenty counties of the state had planned county boys' and girls' fairs and achievement days, but were unable to carry out their plans. At these meetings it is customary for club members to bring in a standard prepared exhibit of their corn, potatoes, one of their pigs, a pen of poultry, or whatever their project may require. These exhibits compete for small prizes and are judged by leaders from the state office or by other specialists. Achievement day is the climax of the club year and is looked forward to by all members. A program is usually a feature, and games and contests, songs, yells and "eats" make the day a long-remembered one.

The highest honor that can come to a boy or girl is to be chosen to represent his county at the annual boys' and girls' institute. This honor signifies that the club member has achieved the best results of all club members in the county in the project which he represents.

This institute has been held for the past eight years at the agricultural college during the month of December. This year we have thought it advisable to postpone the institute until early in the spring. The program, as in the past, will consist of both instruction and entertainment. Every boy and girl that attends will go back into his or her own community and be a leader to inspire the other members to greater efforts the coming year.

There, after all, is the big mission of club work. It is to develop responsibility, leadership and principles of thrift and efficiency in young people, and to give them a life interest in country life and the opportunities which it affords. With the splendid cooperation being given by the rural teachers and many other volunteer leaders, club work is fulfilling its mission.

Every club member who believes in the 4-H education, who "pledged the service of heart, head, hands and health in food production and food conservation, has helped win the world war and the world peace." Nor are they going to stop here, but will go on next year and in each year to come with increased interest, always living up to the club motto, "To make the best better."

Here is the true club spirit expressed in fine fashion,—let's all encourage it: "My garden kept me busy all summer. I often felt like playing when I saw other boys, but I wanted to be Uncle Sam's boy, so I worked and kept my garden up. The most interesting part of it was when people came to see my garden and I could walk around with them and show everything. That's the time I felt proud of my work and was willing to do more. I want to tell all the girls and boys to join the clubs with me next year. I am sure you will be glad that you did. You shall be doing something to win the war. We must all 'work or fight'."

Reorganization of the Agricultural Departments

In order to secure better organization in the different agricultural departments and closer cooperation between the divisions of extension, college, and experiment station, certain changes have been decided upon. This work intrusted to a committee consisting of Director P. W. Trowbridge, Director G. W. Randlett and Dean C. B. Waldron.

Up to the present time the men in any one of the college divisions have been entirely separated from the other divisions. For instance, instructors in any one of the agricultural departments had nothing to do with the work of the experiment station or with the work of extension. The effect of this was to narrow down each man's work to a point where he was not very closely in touch with what was taking place in the department as a whole.

The first department to be reorganized was that of animal husbandry. The following report indicates what the committee had in mind and also what lines will be followed in reorganizing the other departments.

"1.--That the four functional divisions of the institution be recognized and that each department be organized on the basis of expressing itself thru one or more of these functions, as the nature of the case demands.

2.—That the department of animal husbandry be organized at once, comprising at least five professors or assistant professors, assigned approximately as follows: one to devote major time and effort to research work, one to extension teaching, two to resident teaching and a fifth for the present in charge of poultry work and assisting in other work of the department, as assigned. This recommendation should not be regarded as a positive assignment of the duties of the members of the staff of the animal husbandry department. The staff will organize itself, conferring, of course, with the deans and directors concerned.

3.—That the department be organized with an administrative head designated as chairman; that the chairmanship may pass from one member of the staff to another but shall carry with it no superiority of rank; that the chairman be selected in a manner to be prescribed by the board of regents.

4.—That in the organization of the animal husbandry department, beef cattle, horses, hogs, sheep and poultry as indicated above, be included, but the management of the dairy herd shall not be considered a part of its activities.

5.—That for the present the poultry work be under the jurisdiction of the department of animal husbandry with the express understanding, however, that as soon as conditions warrant, it shall be organized as a separate, coordinate department.

6.—That Mr. John H. Shepperd be appointed immediately as a professor in the department of animal husbandry, also to serve as the department's first chairman."

The same committee has also reorganized the dairy department, recommending Professor Keithley as chairman and that additions to the staff be made as rapidly as possible until there is a minimum of five in the department.

Among the other advantages to be gained by the reorganization is that of having a sufficient number of instructors during the winter term to take care of the large number of students in attendance at that time. Heretofore it has been necessary to go outside of the regular college force to get instructors for the winter term. In the future, the men in the experiment station and division of extension will assist with the teaching at the time when there is the greatest demand. All of those who have heretofore been engaged only in instructional work will be given an opportunity to carry out certain lines of research and to get in contact with the stock growers by such work as they will do from time to time in the division of extension. It is not expected that anyone engaged in experiment station work, for instance, will be taken away from that work to the extent of interfering with his usefulness as an investigator, but it is felt that a certain amount of teaching can be done without lessening a man's usefulness as an experiment station worker. The same principle applies to those engaged primarily in any one of the three principal divisions of the college activities.

The reorganization of the department of agronomy will be a more difficult matter, as the management of the college farm, plant breeding, soil survey and some other activities not strictly in the department of agronomy will have to come up for consideration at that time. It is not expected that a complete reorganization of the agronomy department will be possible before the beginning of the next fiscal year.

The idea of having departments organized in this manner, each with its chairman instead of a ruling head, is not new at the North Dakota Agricultural College, since it has been tried out with marked success at similar institutions in other states. Such an arrangement is credited with maintaining a spirit of harmony in the department and of increasing the interest of those in the department, since they are brought into relationship with all of its work and all share in the responsibility.

Book Review

The Teaching of Agriculture: Aretas W. Nolan. Houghton Mifflin Co. Introduction by Dean Davenport. 1918. ix+277 pp.

In his introduction Dean Davenport makes the statement that Mr. Nolan's book is an "honest piece of work." The reader, after perusing the volume, will no doubt agree fully. But besides being an honest piece of work it is also one of the most detailed pieces of work in agricultural instruction issued to date. If honesty abounds, details much more abound. This matter of details however is by no means a fault.

The author covers the subject of agricultural instruction from the first grade up thru the high school. Nature study is to be given in the first six grades, elementary or prevocational agriculture in the grammar grades and vocational agriculture in the high school. The author is very definite regarding high school agriculture, for he says, "The principal aim of high school agriculture should be vocational." In this connection we may mention that Mr. Nolan has a happy way of illustrating these three divisions in agricultural instruction. He says that the lower grade pupil asks "What is it?" The grammar grade pupil asks "How?" And the high school pupils ask "Why?" Agricultural instruction should be in accordance with the questions. Relative to high school agricultural instruction Dean Davenport's influence is evident.

Much of the book is given over to detailed outlines. There are outlines and summaries for nature work, for elementary agriculture and for high school agriculture in all its different divisions. Included are detailed courses for high school classes in agronomy, animal husbandry, soils and horticulture that are very helpful. The appendix alone covers over one hundred pages of courses in detail. In a way it is a very practical handbook for agricultural teachers. The author also emphasizes project work both for the high school as well as the grades. This method, including club work, is of infinitely more importance in teaching farm-craft than the textbook method, so dear to many hearts.

Summarizing, Mr. Nolan's book is of interest to all students of agriculture but it has special value for agricultural teachers doing secondary work. Its only real weakness lies in the fact that while the book tells explicitly 'what to teach,'' it does not give enough attention to the ''how to teach.''

C. G. Carlson,
Acting Supt. of the
A. and M. T. Model High School.

Home Economics Notes

The war did not interfere with the growth of the home economics department of the North Dakota Agricultural College. Not only have the courses formerly offered in the department been strengthened and made to meet the exigencies of the times, but an entirely new line of work has been introduced. From now on the young women of the state who are interested in learning dressmaking should come to the college December 30 and remain six months. The course offered will cover the careful selection of materials, pattern drafting, use of commercial patterns, and designing, cutting and making of garments. The millinery course will embrace the work usually offered in schools for milliners. The training received will enable these students to open dressmaking and millinery shops of their own. It is to be hoped that the young women of the state will avail themselves of the splendid opportunity of learning this trade from a woman who is an expert. Because of the nature of the work the number enrolled in this course must necessarily be limited. Those who enroll first will be given the preference. Write at once to the Home Economics Department of the North Dakota Agricultural College for further information.

Miss Amy Campbell, who directs the trade dressmaking course, is a graduate of Pratt Institute. She has also taken special advanced work at Simmons College. Her practical training has been extensive. In New York she held a responsible position as designer and pattern maker for a large manufacturing firm. She held a similar position in San Francisco, where she managed the designing and making of costumes in a large factory. Her recent teaching experience includes work with private pupils, special classes in large western universities, employment as clothing specialist among the women of the mining districts in California, and as domestic art teacher in the Quincy Homemaking School, Quincy, Mass. Miss Campbell comes very highly recommended and the state is fortunate in being able to secure her services.

The work formerly under the direction of Miss Bessie Taylor, who left to take up war work, will be carried on by Miss Adah Georgene Meadows. Miss Meadows carried on her undergraduate work at the universities in South Dakota and Wisconsin and holds her master's degree from Teachers' College, Columbia University. In addition to her splendid training she has had three years of teaching experience in domestic art at Miami University, Oxford, Ohio.

Miss Adah Lewis, who holds a master's degree from the Kansas State Agricultural College, has been elected assistant professor of home economics to fill the place left vacant by Miss Nola K. Fromme. Miss Lewis is especially well equipped to take charge of the work for which she is elected. Her experience includes that of student teacher and temporary assistant in chemistry in Kansas State Agricultural College, girls' club worker in Kansas; lecturer and demonstrator in home economics agricultural extension service of Kansas, instructor in dietetics, Springfield City Training School for Nurses, Springfield, Mo., and head of home economics department, state normal school, Springfield, Mo.

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High Schools For All

The progress made in North Dakota in the consolidation of schools brings nearer the time when high school education will be a possibility to young people living in the country. The logical development of the consolidated school is that it become a high school. The public school system should be complete in the country as well as in the city. High school facilities should be brought within reach of all. The consolidated school is leading to this end.

Weed Out

One rather definite impression remains from the war-time instruction of colleges. It is that instruction should keep close to essentials, that courses of study should not be unduly prolix or be filled with unimportant and surplus materials. The semester plan, which prevails in most universities and high schools, has a tendency occasionally to cause instructors to fill in the chinks of their courses with details of little importance. A subject that might be presented in two thirds of a semester may be puffed out to occupy a whole one. If instructors would search their hearts and endeavor to hew to the line results would be better. By such process of elimination it would be possible for the student to become acquainted with a wider field of learning without sacrificing essential features in any branch of study. A glance at some of the exceedingly bulky university catalogs will convince fairminded persons—at least create a suspicion—that there is such a thing as academic corpulence. Courses should be stripped to the essentials, and the time schedule be adjusted to the vital content of a course rather than that courses be expanded to fit into a schedule. The time of students is too valuable for them to pursue what some humorist has called the "tail of the detail."

Illiterates

A New York banker declares that the people of the United States are "economic illiterates," which suggests that it is not only necessary to know how to read, but that one should actually read, and to the point. The critic has given us a useful phrase, and the schools will do well to see that no economic illiterates escape, particularly with a diploma.

The Student and the Experiment Station

P. F. Trowbridge, Director

The student in the college of agriculture is apt to regard the experiment station as an institution entirely apart from the school he is attending, something which has no bearing upon his training except perhaps as some results of the local station may be quoted in his college text. This view has not always been confined to the student body alone.

Some experiment station workers, not wishing to be bothered with the inquisitive student, have tried to separate the two organizations, in some states even to the location of them in different cities.

Primarily the function of the college is to instruct, to teach the students the results of investigations already completed. The function of the experiment station is to investigate; to seek to develop new varieties or strains adapted to the conditions of the state; to develop systems of agriculture that will increase production, maintain the fertility of the soil, and decrease the cost of operation.

In the earlier days before the experiment stations were established the teachers did more or less investigation in their spare moments. With some, the intense interest in the investigations caused a neglect of the teaching work and a consequent complaint from the student. As the importance of the investigational work became more apparent and as funds were made available men were selected to give a definite portion of their time to experimental work. Later, men were secured exclusively for investigational work, and when separated for administrative purposes we have the experiment station.

The sharp separation of the college and station works more harm to the college than to the station.

The teacher who is not doing some investigating is (unconsciously perhaps) retrograding. The services of the college man should be regarded as belonging to the state (the college) for the entire year. It is an unjustifiable waste of the money of the state not to make use of the services of the college men during the long summer vacation. The experiment station, instead of being a separate institution, should be regarded as an integral part of the higher educational system of the state and its facilities should be open to the members of the teaching staff. Every teacher should have his teaching work so adjusted that he can be conducting some station work in harmony with the general investigations of his department. In many cases this may go to the extent that his time is definitely divided and the salary is paid from different funds of the institution.

This close touch with the work of the station is bound to make the worker a better teacher. The mind of the student is in an essentially inquisitive state, and the investigating teacher getting himself into that inquiring state of mind is better able to lead the student into profitable mental activities.

On the other hand the station man is made more efficient by contact with the college life. The results of the investigations are of value only as they are made intelligible and available to the people of the state. Every investigator should, if possible, do some teaching at least along the lines of his investigations. He needs the stimulus of teaching to make him whip his data into shape for presentation. Too many of us get into the habit of experimenting just for the sake of experimenting. The investigation is made not for the purpose of furnishing some one a job, but for the purpose of learning something of value to our employers, the people of the state. And we must not forget that the most important thing is the presentation of the results of our investigations to our employers. The investigation has been useless if the results, negative or positive, are not presented. The oral presentation in the class room is of greatest benefit to the hearers, but since the hearers are relatively few this is but the preliminary step in getting the experimenter's data ready for presentation.

But, you say, I am wandering from my theme, which is the student and the experiment station. I have tried to show that the teacher is a better college teacher if he is linked up with the work of the station. The station man in being called upon to present his special investigational work to the college student is adding greatly to the interest of college life by leading the student to see the newness and richness of the field before him.

I have but little sympathy for that newly appointed instructor in animal husbandry who regretted that he had come into college work so late that all the important problems in his subject had been solved. That man had not been in touch with experiment station work during his college course.

Every student in a college of agriculture should endeavor to get into touch with the station work at least in the line of his specialty. To the student who needs to earn at least a portion of his expenses while at college the station furnishes a great opportunity. While earning reasonable wages for his spare time the student has opportunity to absorb fundamental facts concerning the agricultural problems. Let a student work thru a season in the experimental plots where the wilt-resistant flax studies are being conducted. That student will have impressed upon him the importance of wilt resistance more forcibly than any text could teach him. He will go to the home farm as an ardent disciple of Bolley and Stoa, and no longer will he be indifferent to the importance of the selection of flax seed or of any other seed.

We all know the importance of teaching by example, and the experiment station is the great silent teacher of agriculture by example. The experiment station can not be mediocre; it must have the best or the worst of its kind whether it be herds or crops, the best for an example of what to do and the worst as a warning what not to do.

The experiment station is the best and most faithful teacher in the college of agriculture. It never takes a vacation. It is a continual example of the best efforts of its leaders. No student has made the most of his college life who has not come in close touch with the actual work of the experiment station.

The Compilation of a Bibliography

Laura E. Burmeister, Catalog Librarian

A bibliography is a most useful compilation, an addition to knowledge in its particular subject. The compiler gains in knowledge, and the finished product is an aid to others. In its compilation the first essential is to gain a clear idea of the subject unless you are already familiar with it, gleaning your information from such an account as is found in the encyclopedia or perhaps in a magazine article. A broader understanding will come as you work with your material. Then you will realize more fully the development of the subject and can decide whether the bibliography can cover the whole field or give only a partial view. To be sure, a complete bibliography requires less discrimination on the part of the compiler, but a carefully selected and limited one is very much more useful.

After this preliminary acquaintance with your subject the next step is to see what bibliographies have been compiled on the same or related themes, so as not to go over the same ground uselessly. If there is one it may be out of date or on a different phase, but still useful as a foundation. Lists of bibliographies may be found in the Bulletin of Bibliography (quarterly) published by the Boston Book Company, in the Library Journal in its department of Recent Bibliographies, and in the United States Catalog of Books with its annual supplements, the Cumulative Book Index, all of which are likely to be found in small libraries. If you discover the title of a bibliography which looks useful, it is best to get it. They usually can be obtained for a very small sum or even for nothing.

The third step is the gathering of your tools. If your work is done in an orderly fashion, it will be very much easier and much more satisfactory. A small bibliography box or card index case fitted up with guide cards is helpful. For the gathering of your titles you must have cards or perhaps slips of paper which just fit in this box. These will be placed back of the guide cards, first in a very simple arrangement: items to be examined, items examined and items discarded, later subdividing the subject.

You are now ready to gather your entries. The obvious place to look first is in your library catalog, where the books are arranged by subject. Then turn to the library shelves under the class number. This done you may consult general indexes and aids such as the A. L. A. Index to General Literature, printed library catalogs, indexes to long series of books such as Hart's American Nation Series, indexes to government documents and the various periodical indexes. Most libraries will have the Readers' Guide and Readers' Guide Supplement and also Poole's Index to Periodical Literature. Others which are useful are the Industrial Arts Index, Agricultural Index, and Engineering Index, depending on the subject you are handling. Sometimes, too, there are periodicals which are not listed in any of the available indexes, in which case it is well to go thru the indexes of each volume, if it seems at all likely that good material is hidden away there.

In a selective list it is fully as important to gather all available titles as in a complete list. For until you have actually looked at the article or book you cannot tell whether it is fitted for your purpose or not. When examining the actual material discrimination is necessary, discarding the unimportant, deciding what can be omitted and what must be omitted.

Suppose that you now have selected a number of titles which seem to fit into your bibliography, with one title to a card and complete bibliographic information following. By this we mean the author's name, title of article, place of publication, name of publisher, date and edition and price if a book, and name of periodical with the volume number, pages and date if a periodical article. You now examine the material itself if possible, making an annotation on your card which will help to remind you of its value at the time of final selection. If it is altogether unworthy and unsuited to your purpose the reason may be given such as: "Out of date," "Not scientific," "Too technical," etc. and the card filed back of your guide marked "Discards." It is well to keep these discards for they may be useful after all. The contents of a book may be given in place of an annotation as it gives an outline of the material contained. But the annotation is far more useful if it evaluates as well as describes. For this evaluation you may even use the short reviews given in the Book Review Digest or other review periodicals.

This examination of material is the most interesting part of bibliographic work. The ever present question as to whether the article or book shall be discarded or retained and the reason for either course train the judgment to accuracy and precision. One must decide whether the material is to the point, whether it is accurate, whether it is a real contribution to the subject and whether it is authoritative.

In this way one gathers title after title and examines each one, often discarding many more than are retained, till finally the work is ready to be put into finished form. All of the material will have been examined except for a few unusual items which it is impossible to secure tho the reviews indicate that they are worth while. These should be clearly marked in case they are retained, that the user of your bibliography may know that you have not examined them personally.

Now you must decide on the arrangement of the material, of which there are several accepted forms. The one chosen depends on the purpose and scope of the bibliography and on the amount and kind of material found. For short lists a straight alphabetic order is the simplest and best, usually by author. To arrange the entries by order of importance is not very successful as no two individuals will agree as to which really are the more important. A third arrangement is by kind of material or form of literature. For example, if your bibliography is a list of material on a certain historic character there might be first general references, then books about him, periodical articles, fiction and perhaps poetry. Naturally the list would be alphabetically arranged under each subdivision.

A fourth arrangement is the chronological, which is advisable when listing all of an author's works where you give them in the order in which he wrote them.

But in most cases the natural subdivisions of the subject will give a most satisfactory arrangement, tho these subdivisions should not be carried out too minutely. Thus in a bibliography of American history one would naturally subdivide by historical periods; in a bibliography of commerce subdivide by countries; or in one on psychology the subdivisions could be applied, educational, physiological, etc. Under each division the arrangement is again alphabetical by author, while periodical articles and books may be run in together or put in separate groups.

For practical use your bibliography is completed when the cards have been finally arranged in careful order back of clearly labeled guides. But in order to preserve the work it is well to transfer the entries to typewritten sheets. The care with which this is done is the test of the compiler, proving whether or not he has an accurate bibliographic mind. Let him prepare for himself a set of rules, or if he lacks imagination in that line, let him secure a good example of bibliographic work and follow it. The local librarian may be called upon for assistance as she is familiar with cataloging rules. But a few notes might be given here as a foundation.

For the author entry, give the surname followed by the two or more initials. If only one forename is found spell it out in full.

The title should be brief as possible and following the exact words of the book.

The edition is included if important.

The place of publication and name of publisher, both abbreviated, and date of publication are next. These abbreviations can be found in any number of the United States Catalog or Cumulative Book Index.

If the series is important it should be included, and the price is sometimes added.

If your annotations have proven their worth when compiling your bibliography they will be even more useful later. They can be added after each entry, indented so as to form a paragraph and inclosed in quotation marks if they are some one's else words, with the source following.

Finally be sure that the completed work is provided with a short introductory paragraph to explain the purpose, scope and arrangement, and any peculiarities which might not be clear to others than the compiler. Then with uniformity in spacing, punctuation, capitalization and amount of information included with each item, the finished bibliography should present a business-like appearance as well as being a contribution to knowledge.

Factors in Hardiness

C. B. Waldron, Dean of School of Agriculture

The term hardiness as applied to plants over the greater part of this country and particularly in the region where most of us live is used to designate the ability of a plant to endure winters. It is well understood that this quality is primarily inherent in the plant itself. It may be regarded as a plant character and on that account in the same general category as size, color, productiveness, earliness, etc. Reasoning from that basis might we not reasonably expect to change or increase the degree of hardiness in a manner and to an extent comparable to the difference in appearance and habit of our various varieties of chrysanthemums, potatoes or cabbage?

Leaving that question for the present may not the plant's environment or treatment in the matter of moisture, food, cultivation or kind of soil, be a factor in determining whether it shall respond with leaf and flower to the blandishments of the succeeding springtime or pass to the brush-pile of the things that were?

As a general proposition we know that certain regions are growing corn, alfalfa and apples with a greater degree of success than formerly, and without scrutinizing very closely the reason for this we imagine perhaps that the time will come when our plants will adapt themselves to an ever widening range and most anything can be grown most anywhere.

In the early days, before science made us wise and experience made us sad, the magic word acclimatization carried with it a world of hope and expectation. We hadn't a very definite idea of the processes that were to give to us our super-plants, standing undaunted and unscarred before the elements, but the rainbow promise had been given and we couldn't resist its glow and beauty. We have come to realize that if acclimatization does occur it has a different meaning than was ascribed to it and that it is change of habit rather than change in constitution that adapts plants to regions where they could not formerly be grown.

The experimental data bearing upon the possibility of increase in hardiness have naturally been very few and such as they are bear indirectly rather than directly upon the subject. To have discovered that certain methods of culture will enable a plant to live over winter when it would die with different treatment, simply means that we have stepped in and adapted the climate to the plant rather than the plant to the climate.

Such lessons as we have learned along that line by experiment and observation are of great value to us, but they are outside the fundamental question of whether the character of hardiness can be modified as can that of size or of earliness, or whether this character is so fundamental and inherent, so intimately related to the physiological plant processes, that there can be no possibility of change in any reasonable period of time.

We know in advance that species have certain physical characters and that some of these species like Pyrus baccata are hardy. We rightly conclude therefore that an apple tree showing baccata origin wholly or in part is hardy, but in the case of two apple trees of the same origin there is no distinguishing feature in form or structure that is an indication of hardiness. Moreover, much of the supposed difference in hardiness between different varieties of a species is more apparent than real. The difference is that of habit rather than constitution. Certain varieties of melons and tomatoes can be grown at the north because they mature early. They are still essentially tropical.

Our hardy varieties of grapes and apples are those that mature early. If there is a difference other than this it will be found to be a difference of origins, equivalent in a physiological sense to a difference of species.

Soft maple seedlings grown from Illinois seed are not hardy in North Dakota while those from central Minnesota are. The former hold their leaves late. If fully matured they might endure as much cold as the northern ones.

The only successful apple orchards in North Dakota are those on warm, sandy soil that makes for early maturity. In such orchards even the Northwestern Greening makes a fair showing, while the Patten, Iowa Beauty and Wealthy are very satisfactory. But it would be a mistake to think of early maturity as the only factor in hardiness.

A tree to endure the winter, must be able to retain enough of its moisture to enable it to resume activity in the spring.

One of the effects of cold on plant tissues is to extract the moisture from the plant cells and deposit it as ice crystals in the intercellular spaces. This process may be continued till it results in the death of the plant, particularly if the plant be subjected to drying conditions such as are characteristic of our western prairies.

The white pine and balsam fir are very much at home in the forests of northern Minnesota, but quickly succumb when planted on our prairies. On the other hand the western yellow pine and Black Hills spruce retain their moisture in spite of drying winter and spring winds and live.

Whatever can be done in a cultural way in the use of windbreaks and mulching to prevent loss of moisture is of course a direct advantage.

Species having a wide range over regions of different climatic conditions, like the cottonwood and red cedar for instance, show varying degrees of hardiness depending upon the region in which they are native. This simply means that during geologic times changes may occur within the species after the same manner that greater changes have given us distinct species. As a matter of fact the botanists must allow the horticulturists, if they so please, to consider the Black Hills spruce as a different species than the eastern white spruce and the Missouri River cottonwood similarly distinct from the Carolina poplar.

On the other hand we have no record of a species that within historic times has given us varieties distinctly hardier than the species, tho of course we have many varieties that because of their changed habit are better suited to the north than was the initial species. In other words it takes a longer time than man has at his disposal to change the character of protoplasm and remold the plant cell.

It makes little difference to a cabbage plant whether its leaves be wrinkled or smooth, red or green, but when we try to exert an influence within the leaf that will be reflected in the offspring, we realize that we are getting next to some very fundamental and vital matters, and the calm manner in which the cabbage and all its progeny ignore our efforts shows us our limitations. It is obviously out of the question for a plant breeder, even tho a wizard, to impress upon a plant characters not possessed in any degree by the parents. As we now know, a character such as hardiness may pass over to the offspring undiminished tho but one of the parents possesses it.

We can therefore safely lay down the following principles:

1. Hardiness, as we use the term, is a quality so fundamentally inherent in plants as to be modified little or not at all by selection over reasonable periods of time.

2. Early maturity is the most important factor in adapting plants to a cold climate and selection in that direction offers the most promising results in the matter of extending the northern range of our domestic plants.

Also a type of soil and cultural methods favoring early maturity are important factors.

3. Loss of moisture during winter by plants otherwise hardy is a common cause of winter killing. It can be prevented in a measure by mulching to prevent or delay hard freezing about the roots and also by the use of windbreaks and shelter belts.

4. Root killing is a common cause of the failure of certain plants to endure cold climates. This may be caused by a sudden freezing of roots not fully matured, by over severe freezing or by freezing dry as would occur in a dry soil. The remedy is, of course, proper cultural methods, including generous and timely mulching and the use of hardy stocks and long cions in grafting.

5. More attention should be given to the origin of plants, since widespread and complex species include many strains or subspecies of varying degrees of hardiness.

6. In plant improvement by the commonly practiced methods of crossing and selection it is essential that one of the parents bred from be of the first degree of hardiness as no plant can inherit what its parents do not possess.

Because many of our earlier ideas of hardiness were inconsistent with later discovered facts and because many of our early trials ended in failure, we need not give up the effort of making the regions in which we live more attractive and fruitful, for within certain reasonable limits and in accord with established laws there is still a field for plant improvement that should encourage all of us, even those living in the most trying and difficult regions. Knowing what not to attempt, we can center our efforts upon the possible in the reasonable hope that our efforts, in due time, will be rewarded.

New Buildings

Barracks

This is a frame building covering approximately one-half acre of ground, and with a total floor area of 31,538 square feet. It consists of sleeping quarters, mess hall, kitchen, offices and toilet. The sleeping quarters are two stories in height; the other portions are one story. It is provided with steam heat, electric lights, showers, etc. and will accommodate 400 men. The construction work was done largely by the soldiers training in the carpentry group. The building will be readily converted into dormitories and laboratories for industrial course work.

Automobile Laboratory

A room, 28 x 67, built of brick, has been added to the engineering shops. This is used as a laboratory for the automobile mechanics.

Automobile Shed

To provide space for repairing automobiles during the winter months, a temporary frame structure 48 x 72 has been erected. It will furnish space for twenty to twenty-five cars under repair.

COLLEGE AND STATE

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Amount of Vocational Training

The length of time required for preparation for a vocation depends upon the vocation. Some vocations require but the slightest preliminary training while others imply a preparation extending over years. The present United States commissioner of education was once asked how much vocational training was needed by the girl in the shirt waist factory whose work consists of sewing in, not both sleeves, but the right or the left. His answer was "None." In contrast with employments for which no training or but the slightest is required there are others of the most exacting demands. In dealing with vocational education a sure principle is to recognize the extremely diverse amounts of vocational training called for by different occupations.

The Economic Factor in Rural Schools

The economic factor in the rural school situation is an important one. The available wealth within the country district has a close bearing upon the excellence of the rural school. When school districts are poor the result is that schools are poor. With increase of the farmer's income there will be improvement in rural education. The drift of the best teachers to the cities can be checked by financial counter-attractions. Conditions in rural education reflect rural economic conditions. The rural school problem rests essentially upon an economic foundation.

Unemployment—For Children

Recent federal legislation (Pomerene child labor amendment to the revenue bill) prohibits child labor, reinstating a provision of law enacted some time ago but held unconstitutional by the federal supreme court. Such prohibition by federal law and the anti-child labor legislation in several states will have a wholesome effect upon school attendance and by keeping children out of the industries help to solve the problem of adult unemployment. If there is any unemployed class it should be those whose presence is desired in school. Universal school attendance up to the age of eighteen years would accomplish excellent results, both by affecting the character and preparation of young people and by lessening the amount of adult unemployment.

Rural Architecture

Walter G. Ward, Assistant Professor of Architecture

In general, rural architecture has like Topsy "just growed up." Tho there are many exceptions, the average farm building is not a complete success, either from the utilitarian or esthetic viewpoint. Failure to recognize some of the fundamental problems involved; lack of study on the problem; copying of city work; lack of a comprehensive program toward which to work; and inaccessibility of information on the subject, might be cited as some of the causes of the unsatisfactory results often in evidence, even tho the owner has expended a goodly sum in his building operations.

Many wealthy men thruout the nation have, by way of diversion, built handsome farm buildings of excellent plan and setting which show very creditable work on the part of the architects and landscape gardeners responsible for the design and arrangement of the buildings and grounds. These improvements, however, are not financed by profits from the farm on which they are placed and usually represent an investment far beyond what the income from the land would justify. This kind of solution therefore does not apply to the average bona fide farmer who must pay for his improvements out of the profits from the farm.

A successful country architecture does not mean that the farmer's house must be a mansion, and his other buildings of stupendous dimensions and adorned with towers, turrets and cupolas. Some of the points which might be mentioned as essential to the successful solution of rural architectural problems are:

1, Suitability of plan. A house of excellent plan for the city man might be entirely unsuited for the farm.

2, Appearance in harmony with surroundings. Houses built on the level prairie should emphasize the horizontal lines rather than jutting up above the horizon, tall and slender; while a house built among the hills may well bring out the vertical lines.

3, Grouping of buildings. The location of buildings on the farm with relation to each other, for appearance and convenience, deserves more thot than is sometimes given.

4, Conveniences for health, efficiency, comfort and happiness.

5, Trees and other landscape features.

Looking toward the solution of the problem of securing a better rural architecture, several efforts have been made recently. Some of these movements are being made by publishers, some by private and corporation interests, and others by the federal and state governments. An effort is being made to coordinate some of these movements thru cooperation and it is to be hoped that some way will be found to use these various agencies to build up a definite program which will have for its purpose the improvement of country architecture. While interest in the subject might properly be centered on the farm house, the problem is not solved unless it includes the other farm buildings and the landscape.

The federal government has for several years, thru the department of agriculture, given consideration to the problem of bettering farm improvements, and has prepared bulletins on several phases of the subject. For the most part the matter treated in these bulletins has been general in character, for with a nation of great area and a wide range of climatic conditions detailed solutions of problems for one section of the country might be valueless in other sections. Mr. Etherton, who did much of this work for the department of agriculture, recommends that each state take up its problems of this kind, and in a few states a limited service is maintained.

The neighboring state of Minnesota has been awake to this need for several years, and thru her state art society, a department of the state government, has created an interest which is evident in many splendid farm structures in that state. A few years ago the society conducted a competition for a model farm house. A number of the best architects in the state participated, and the results were made available to the public thru the department of agriculture of the University of Minnesota. The extension division of the university has also given considerable attention to the subject.

Several associations representing the manufacturers of building materials have in recent years done very creditable work in distributing information useful to the farmer in the solution of his building problems. It is of course a far-seeing policy on the part of these associations to compile, publish and distribute, gratis, this information. These associations are glad to cooperate with other agencies looking to better farm improvements.

Private parties have from time to time shown interest in the subject. A prize competition for designs for three farm houses costing $500, $1200, and $3500 has been announced within the past few weeks. The prizes are offered by the president of a Wisconsin real estate firm.

The cases cited indicate the diversity of interests which have in various ways touched on the problem, each perhaps good in itself, but nothing yet undertaken has been sufficiently comprehensive in scale to even touch on many phases of the general problem.

A plan of action has recently been advocated by one of the leading architectural magazines in this country, to have formed in each state a commission to serve without pay, to investigate the problems of rural architecture and report to the governor just what could and should be done to effect the desired purpose. This plan is patterned after that of the National Art Commission, which is made up of a group of capable, public spirited men, who serve without remuneration, but whose recommendations have great weight in the matter of art and architectural work with which the federal government is concerned. Congress frequently stipulates that the plans for certain proposed structures must be approved by the National Art Commission.

The nature of the work of the proposed state commissions would vary somewhat from that of the National Art Commission and in general would seek out the problems in rural architecture to be solved and designate the agency thru which the work should be undertaken. To the state institutions of higher learning would probably fall these duties. As evidence of the realization of the existing problem, might be cited the fact that a recent editorial in a leading architectural magazine on the subject, Improving the Design of Farm Buildings, was sent to the governors of all the states, and about two-thirds of them replied. The replies unanimously agreed that such a problem exists and that a solution should be sought.

If from the various efforts can be secured the necessary interest and support to have the problem intelligently studied and to establish in each state some responsible agency for the dissemination of information pertaining to all phases of farm improvements, it might reasonably be expected that the next decade would witness a marked improvement in our rural architecture. Just how far the work of such an agency should go in its aid to the farmer would be determined by the commissions appointed to study the question. It is not to be expected that plans and specifications would be prepared for buildings for each individual. There might well be, however, designs for a few representative buildings of each kind, carefully prepared, not to serve as models, for local conditions require individual solutions, but to exemplify some of the most desirable features and be a source of suggestion which may be incorporated in one's own building scheme. Bulletins on many topics could be prepared, each taking up for consideration subjects vital to the successful solution of any building scheme; for example—safe chimney construction, heating, plumbing sewage disposal, ventilation, farm lighting plants, shade trees, roofs, floors, painting, and scores of others. The value of a comprehensive service of this kind would be immeasurable. A successful solution of the farmer's building problem is not necessarily more expensive than the unsatisfactory results which are found all too commonly. Lack of sufficient thought and study on building problems and the inaccessibility of information on the subject doubtless account for many of the poor results. If instead of thinking of only one building with which he may begin, the farmer would formulate a plan for a completely equipped place and make each improvement in accordance with that general plan, the finished work would certainly not show the motley array of structures all too common on many farms thruout our land. A farm may not need large buildings, but if structures are well planned, neat in appearance, kept well painted, and with plantings of trees and shrubbery, the farmer may have a home attractive to look upon, and one in which he and his family may find pleasure and contentment.

Laboratory Work in History

Edgar G. Meinzer, Assistant Professor of History and French

The purpose in teaching American history in a high school is not merely to impart information but also to develop good citizenship. The student should be given an insight into the great questions of the day. He should have training in discussing these questions before an audience, and in political organization and leadership. The study of the current weeklies and monthlies, while valuable, nevertheless fails to give the student a grasp of the more fundamental problems of our nation. Current periodicals often give much space to matters of only transient importance, while other problems of long standing are not discussed.

To provide the students with a more systematic and thoro understanding of national problems of really fundamental importance, the writer found the organization of an "A. C. Congress" to be a very successful method.

The "A. C. Congress" was composed of the students in high school American history at the North Dakota Agricultural College. The 1:30 section was the house of representatives and the 2:30 section the senate. The congress was in session during the last six weeks of each winter term in 1915, 1916 and 1917, and the work took the place of the regular history lesson. The students were nearly all seniors. Most of them were from the country and averaged far above the ordinary high school age. Several were former teachers. Sprinkled in with these very desirable students was always a small number of immature triflers.

The congress consisted of two houses, the ideal membership of each being 24. The democrats were seated on one side of the aisle and the republicans on the other. On the day before congress met, each party held a caucus and nominated a speaker. When the clerk called the house to order, the president of each caucus nominated the caucus nominee and each member voted with his party. The speaker always presided, acting as timekeeper. The teacher acted as clerk. Each house had four committees, and each student was a member of one committee. There were committees on ways and means (finance in the senate), elections, foreign affairs, and agriculture. The majority party had a majority in each committee and also all the chairmanships. The democratic members of the ways and means committee selected the democratic committee members and the republican speaker (or defeated candidate) appointed the republicans. The democrats on the ways and means committee were selected by the party caucus. The chairman of this committee acted as floor leader of the majority and the defeated candidate for speaker as floor leader of the minority.

Four debates a week were held, each student speaking once a week. On the Thursday preceding a week of debates the instructor wrote four resolutions on the blackboard. Each student then filled out a slip, indicating on which side he wished to speak and which of the four questions he preferred. The instructor then arranged a schedule for the week and posted it on the blackboard on Friday. No student was ever compelled to speak on a side in which he did not believe. The leaders of the affirmative then introduced bills containing the substance of the resolutions, which were referred to committees. On Monday these committees met and decided whether or not to recommend the bills for passage. Each debater was limited to four minutes and the leaders had rebuttal speeches of 3 minutes, making a 30 minute debate. The clerk then called the roll and each member of congress answered "aye" or "nay" to his name. Students were instructed to vote as they believed, and not as to the ability of the speakers. If the bill passed it was sent to the other house for passage. The instructor had the veto power, but never exercised it, except in the case of the bill for a literacy test for immigrants, which Presidents Roosevelt, Taft and Wilson had all vetoed. However, in 1917, the students passed this bill over the instructor's veto by a two-thirds vote in each house and it became a law.

The remainder of the hour was given to 3 minute reports on special topics assigned in advance. These topics were usually taken from articles in bound volumes of the Review of Reviews in the library. These articles dealt with phases of the debate questions or with other subjects not adapted to debate, such as child labor, mothers' pensions, etc. Thus each student appeared before the class every alternate day.

The debate questions varied slightly from year to year, but usually included the following topics: repeal of the fifteenth amendment, "Jim Crow" laws, the tariff, government ownership of railroads, of telegraph and telephones, woman suffrage, a large navy and "preparedness," intervention in Mexico, independence for the Philippines, compensation to Colombia, embargo on munitions, trust regulations, a literacy test for immigrants, the recall of judges, the guaranty of bank deposits, employers' liability and workmen's compensation, a minimum wage for women, a "blue sky" law, state terminal elevators, a rural credits law, the drift to the cities, farm production possibilities, farm business efficiency, and the Fargo city government. The last week was devoted to state and city affairs, the topics being made national as parts of appropriation bills.

The congress was always a complete success. The students were intensely interested and the attention given each speaker was always very good, as each student felt that he was a legislator responsible to his constituents "back home." There was a sense of reality that was extraordinary. The fight for the woman's suffrage amendment in 1915 was a real battle. It had passed the house, but was in danger in the senate. The young woman who had charge of the bill in the house attended the senate session to work for its passage, where it received the bare necessary two thirds. Susan B. Anthony is dead, "but her soul goes marching on." When the Nonpartisan League was up for discussion in 1917 the affirmative leader conferred personally with A. C. Townley and the negative leader with Treadwell Twitchell. Congress was not in session more than a few days before it became evident that the division into democrats and republicans was an utter farce. Neither party ever voted as a unit, not even on the tariff. But there was a real and sharp division of the members into progressives and reactionaries. The majority party usually developed a powerful "machine" consisting of the speaker and the committee chairmen. The reactionaries always displayed more political skill at the beginning and frequently got control of the majority party machinery when the house was being organized. The progressives then became "insurgents" and refused to abide by the party caucus. This would lead to much bitterness within the party. However, in every congress the progressives had a majority over the reactionaries in votes on bills. A striking fact was that a student's vote was consistently progressive or reactionary on all questions. For instance, if a student had race prejudice against the negro he was also opposed to woman suffrage, prohibition and progressive labor laws, and in favor of imperialism. A number of very reactionary students were found in these classes, but the majority of the North Dakota young people were always progressive and humanitarian.

Did it pay? One Fargo youth remarked: "That congress is a snap. You don't have to study—just talk four minutes a week." Another elderly student described it as "a perfect torment." He was a progressive insurgent democrat, persecuted by the party bosses. But many students have expressed their great appreciation of its value. One student, now a teacher, declared it to be the most valuable thing in her entire high school course—"It opened my eyes to things I never knew before. It set me thinking." One young man became so enthusiastic that he read an entire history set of six or eight volumes in the library. Another student became so interested in terminal elevators that he later became an organizer for the Nonpartisan League. It is not likely that any person who participated in the victories and defeats, the humor and the bitterness of the "A. C. Congress" will soon forget the experience.

An Engineer's Comparison of the Large and Small Colleges

A. R. Nottingham,
Assistant Professor of Mechanical Engineering

Each year men in the teaching profession are approached by students desiring information concerning colleges with which the instructor is familiar and for advice or suggestions to assist them in shaping their educational career.

In such discussions there is always recurring the question of whether it is better to select a large or a small school in a given line.

In this case as in nearly all others no hard and fast rules are possible but a few of the points bearing on the two classes have seemed worth while to note.

A school should be selected for the thoroness of its work along the fundamental and practical lines for a foundation or undergraduate course, and then on this broad stable foundation may be built a specialization either in school or in connection with a vocation that will yield the most gratifying results.

We are told that this is an age of specialization, and prompted by this statement hundreds of students just out of high school are talking of specializing in a profession such as engineering, and take a specialized course. After going into practical work they often find themselves unsuited to the work, or if they are successful they become narrow and unbalanced.

Even a casual examination of the graduate roster of our large institutions shows that a large percentage of men have found themselves to be as square pegs in round holes, and as graduates in engineering have gone into the real estate business, to selling pianos or into some other line of work for which their college course gave them no direct preparation. More unfortunate even is the fact that many of them have given up all desire to study or advance themselves beyond their fellow worker who has only a very limited education.

A playmate perhaps being unable to go to college learned a trade, studied all his spare time and became a successful engineer in the line in which the other man once aspired. Too many of our large institutions run like an automatic sawmill taking all the logs that come down the river unsorted; rafted logs, strays, broken rafts from the big jams consigned to other mills, and turn out let us say axe handles as the finished product. Obviously the culls would be many and many that might be passed on to the inexperienced user would fail utterly, being made of timber fit only for rough crating. Our colleges have spoiled thousands of good farmers and mechanics, have fitted them for nothing in particular, and made them dissatisfied.

Continuing the above analogy, how much more to the point is the frontiersman who selects his trees standing—good second growth hickory—cuts, splits and seasons the timber at odd times and works them up with a few primitive tools. He has none of the efficient mechanical equipment yet his work is nearly a hundred per cent efficient, considering the finished product, for he makes up not only axe handles, but other things as eveners and axles. From the failures and scraps he also makes hammer handles etc. down to cultivator pins.

It is true that some schools have made an effort to sort the grist coming to their mill, but the men who really can do this sorting properly are rare, their opportunity is usually limited and their handicaps many.

There are few men who go to college, with the many lines open before them, who can choose their lifetime specialty before the age of thirty, or some five years after graduation. It would seem better to take a good practical general course with a thoro grounding in the fundamentals and specialize along with their vocation the rest of their lives.

This latter is much more nearly what the small college does, and under favorable conditions the students gain much more from their close personal contact with their instructors than from the pure technicalities studied.

Thus in a small school a professor may be in intimate contact with a student two or three years and make both a man and an engineer of him.

In some of our large schools an instructor may teach only one problem, as the calibration of pressure gages, and the students meet him in as large numbers as he can accommodate for only two to four hours in their career. The larger school has a wealth of apparatus and equipment, which the small schools can only dream of owning, and yet this does not make engineers. Such an array is too much for the student to assimilate and make a part of his mental fibre. A school so equipped is excellent as a graduate school for the mature man who has gotten the right start, knows what he wants, and understands the fundamentals clearly before entering, but to attempt to teach the fundamental and the full detail together is like making up unseasoned wood—bound to be unserviceable. A person naturally selects a physician for his judgment and experience as well as his book knowledge, either gotten in school or out of school. In the engineering profession practical work is largely a matter of judgment and experience. Owners of plants which cost thousands of dollars will not put them in the hands of a person lacking either judgment or experience, for they may be maintained or ruined, the economy lost entirely, or the business put on the road to success or failure by the engineer's choice of course even after mathematical and theoretical studies have been carried to their limit.

This then is the general comparison of the large and small schools In the former the product is machine made, often from unassorted material, while the latter produce hand made—often less perfect mechanically—but very employable products, each one fitted to immediate service and a future of continual development and advancement.

Federal Seed Grain Loans

T. A. Hoverstad,
Agent Federal Loan Bank

President Wilson last fall set aside $5,000,000 for loans to farmers in the Great Plains country, the loans to be made only to farmers who had met with crop failure in 1917 and 1918 and who had no commercial basis for credit.

The government takes a mortgage on the crop grown from the seed on which it advances the money. It is to be expected that there will be some crop failures. To make up for this a guarantee fund is collected from those farmers who have been successful in raising good crops. The farmer who secures six bushels per acre, pays the loan with interest at six per cent. The farmer who secures more than six bushels per acre, pays an additional fifteen cents for each bushel above six and up to eleven so that the farmer who secures eleven or more bushels per acre pays seventy-five cents in addition to the amount the loan calls for. In case all of this fund is not required to take care of failures, the balance will be prorated back. No farmer is furnished money for more than 100 acres, which may be part rye and part wheat or all of either one of these crops.

The loans are made by the federal treasury department. The plan on which these loans are made is as follows: farmers who wish to avail themselves of these loans make formal application on blanks specially prepared. They report the amount of land, livestock and machinery they have and their mortgaged indebtedness. They also report the crop yield of the past two years. This is certified to by the county agent and also the local banker. It is also approved by a representative of the national department of agriculture and an agent of the federal land bank of St. Paul, who is acting as a financial agent. When the seeding is done the county agricultural agent issues a certificate of planting and the mortgage and note and also a guarantee fund agreement are signed by the applicant.

The loans made to farmers on fall rye and winter wheat totaled $2,396,460. The loans now being made on spring wheat will likely use up the balance.

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Training For Citizenship

‘‘The schools cannot develop mental fibre if the pupils are carefully shielded from knowledge of the topics that men and women think about. The schools cannot prepare for active citizenship, if the pupils are not allowed to discuss, under intelligent supervision, the problems of citizenship The habits of tolerance and of intellectual fairness towards opponents cannot be formed without the discussion of topics that give opportunity for their exercise. The failure of our schools to develop these habits has been made all too evident by numerous campaigns in which reason has been clouded by embittered intoleranec.

‘‘Whenever topics on which honest men differ arise in the classroom, as in the study of science, history, civics, English, it shall be the duty of the teacher to inculcate the principles of tolerance, of the open mind, of courtesy and fairness to opponents; to stimulate intellectual honesty, and the desire to see all sides of a question; to emphasize the sacredness of the right of the individual to his own honest beliefs and convictions, provided only that they do not conflict with the rights and welfare of the community and humanity.’’—Charles B. Stillman, President, The American Federation of Teachers, in The American Teacher, Feb., 1919.

The Development and Success of the Cooperative Elevator Movement in North Dakota

Edwin Mayland, Farm Management Demonstrator

North Dakota stands foremost among the states in the union in the production of spring wheat, barley and flax. It will probably continue in this position indefinitely owing to its favorable soil and climatic conditions for the production of cereal crops. Statistics show that from 1899 to 1915, inclusive, there has been a steady and rapid increase in the volume of grain produced. The maximum was reached in 1915 when North Dakota produced 151,970,000 bushels of spring wheat, 98,000,000 bushels of oats, 44,800,000 bushels of barley, 6,574,000 bushels of flax, and 2,700,000 bushels of rye.

The raising of such a large volume of cereals has created problems in marketing. Up to 1900 the bulk of the local elevators were owned by the grain companies who established lines or series of elevators within a certain district or along a certain section of railroad so that the buying of grain at the local markets within a given district was in the control of perhaps one or two companies. This condition had a tendency to eliminate competition in the buying of grain so that the producers eventually became conscious of unjust treatment at the local markets. The grievances of the producers as directed towards the line elevators were crystallized into three forms. First, that the margin between the local price and the price paid at the terminal market was too wide. Second, that there was unfairness practiced in dockage. Third, that the system of grading practiced imposed an injustice upon the producer.

These conditions led to the development of local farmers' organizations intended to improve the marketing conditions for the producer, the first of which was the so-called farmers' elevator.

The farmers' elevator movement started in North Dakota about 15 years ago. At that time most of the farmers' elevators were organized on the usual corporation plan. The stockholders in these elevators are usually made up of both farmers and merchants. Under this plan the stockholder is entitled to as many votes as he has shares, with the usual result that the control of the company is vested in a few individuals. The profits derived from the business are divided on the basis of the amount of capital stock issued and each stockholder receives dividends in proportion to the number of shares in his possession.

There are at present between 500 and 600 farmers' elevator companies in North Dakota. While many of these elevators are called cooperative elevators they are not so in the true sense of the word. It is only within the last 10 years that elevators have been organized on the cooperative plan and it is only during the last three years that the cooperative elevator movement has assumed any development of a significant nature. There are at present approximately 150 cooperative elevators in North Dakota. Many of the farmers' elevators are now changing from the stock dividend plan to the patronage dividend or cooperative plan so that it may be said that the organization of cooperative elevators now originates in two ways; namely, thru the formation of entirely new companies and thru the reorganization of farmers' elevator companies already in existence. When it is desired to change from the stock dividend plan to the cooperative plan the old company is dissolved. This is usually done by circulating a petition and agreement of dissolution among the stockholders of the old company. Another list is circulated to secure subscription for stock in the new company. When enough signers for both petitions have been secured the new company is organized. A meeting of the old company is called to pass resolutions authorizing the sale of the property and as soon as the new company receives its charter the transfer can be made.

All incorporated cooperative organizations in North Dakota are organized under the cooperative corporations law—Chapter 13, Civil Code, Compiled Laws 1913, and Chapter 92 Session Laws 1915. Perhaps the most important features of this law are those which apply to capital, limit of interest, shares and the distribution of earnings, and the law pertaining thereto is quoted herewith as contained in Section 4606 Compiled Laws 1913 and Section 1, Session Laws 1915.

> 4606. Capital. Limit of Interest. Shares.) The amount of capital stock shall be fixed by the articles of incorporation. which amount and the number of shares may be increased or diminished at a stockholders' meeting specially called for that purpose; but the whole amount of stock shall never exceed fifty thousand dollars. Within thirty days after the adoption of an amendment increasing or diminishing its capital, it shall cause the vote so adopting it, together with a record of the minutes of said meeting, to be filed for record in the office of the secretary of

state with its original certificate. No share shall be issued for less than its par value, and no member shall own shares to more than one vote. It may commence business whenever thirty per cent of the stock has been subscribed for and paid in, but no certificate of shares shall be issued to any person until the full amount thereof has been paid in cash, and no person shall become a shareholder therein except by consent of the managers. (1909 ch. 62-4)

1. Cooperative Associations.) For the purpose of this Act, the words "cooperative company, corporation or association are defined to mean a company, corporation or association which authorizes the distribution of its earnings in part, or wholly, on the basis of, or in proportion to, the amount of property bought from or sold to members and to other customers, or of labor performed, or other services rendered to the corporation. Provided, that nothing in this Act shall be construed as in any way conflicting with or repealing any law relating to building and loan associations or installment investment companies.

A number of cooperative elevators in North Dakota are being organized under the auspices of one of three different organizations. There are the Equity Union, the Farmers' Educational and Cooperative Union of America, and the Equity Cooperative Exchange. The independently organized cooperative elevators are largely represented by the Farmers' Grain Dealers' Association of North Dakota.

When it is desired to organize a cooperative elevator company the first step usually consists in the preparation and circulation of a petition for the subscription of stock. The forms of petition used are made and worded somewhat according to the following form:

Subscription for Stock

We, the undersigned, do hereby subscribe for the number of Shares of Capital Stock set opposite our names, in a Cooperative Elevator Company, to be organized at .... North Dakota, of which the articles of incorporation are to contain, among other things, the following provisions, to-wit:

The Shares of Stock to be for $................ each.

Each stockholder to have only one vote, regardless of the number of shares he, or she, may hold.

The Board of Directors may set aside into a surplus fund, or undivided profits, out of the profits each year, such sums as they may deem necessary for the development and improvement, and carrying on, of the business.

Then they may declare a dividend of not to exceed eight per cent per annum on the capital stock.

The balance of the profits to be prorated back to stockholders, and other customers, according to the amount of business done with the corporation during the past year.

The company to be incorporated under the provisions of Chapter 13, of the Civil Code of the Compiled Laws, of the 1913 and Chapter 92, Session Laws of 1915, of the State of North Dakota.

Name	No. of Shares	Name	No. of Shares

....

(Space for Signatures)

Application for blanks for articles of incorporation and for a charter must be made to the secretary of state. The articles of incorporation are signed by the subscribers of stock and incorporators.

The board of directors named in the articles of incorporation serve until the first regular annual meeting of the stockholders.

A stockholders meeting for the purpose of adopting by-laws must be held within 30 days, after the application for charter has been filed.

When 30 per cent of the stock has been subscribed for and paid in and the board of directors and officers elected and the articles of incorporation filed with the secretary of state a charter is issued and the company may commence business.

The business affairs of the cooperative elevators are conducted by the board of directors. Immediately after their election they must organize and elect from this number a president, vice-president, secretary and treasurer. The president's and vice-president's duties are such as usually pertain to those offices.

The secretary keeps a record of the meetings and of all shares of stock sold. He countersigns all contracts when authorized by the board of directors. He countersigns all certificates of stock when sold. He signs all vouchers for expenses after duly audited by the board. He makes monthly reports of the business to the board of directors at their monthly meetings and a complete annual report to the annual meeting of the stockholders. Before entering upon his duties he gives a bond as required by the board of directors which must be obtained thru some reliable surety company.

The treasurer is held responsible for all funds turned over and delivered to him by the corporation and he must furnish a surety bond sufficient in amount to cover all moneys that may be placed in his possession.

The board of directors appoint grain buyers and managers for the different departments that may from time to time be established according to the provisions of the articles of incorporation. The grain buyers and department managers have general charge of the departments to which they are assigned. Each grain buyer and manager is required to give bond for the faithful discharge of his duties and said bond to be obtained thru some reliable surety company; all such bonds are paid for by the corporation.

Officers, grain buyers or managers of coöperative elevators are usually prohibited from speculating in the grain market, but "hedging" against stored grain or grain actually in possession of the corporation is permitted and found necessary.

At all meetings of stockholders each stockholder is entitled to only one vote regardless of the number of shares that stand to his credit on the books of the corporation.

A careful system of accounts of each department is kept separately in books provided for that purpose. The cooperative elevators are beginning to adopt a uniform system of accounts. This is increasing the efficiency in keeping and auditing the accounts.

The method of distributing profits can perhaps be explained most fully by quoting a section from the by-laws of a recently organized cooperative elevator company dealing with this phase of the business.

> "From the revenues or profits from the business of each department the board of directors shall pay all the expense of said department including repairs of the buildings and machinery, taxes, insurance, wages and salaries to employees and a dividend not to exceed 10 per cent on the capital stock invested therein. There shall then be set aside, as a sinking fund, such sums as the board of directors may deem necessary to promote and develop the enterprise or bus-

iness represented by the respective departments. The remainder of the profits derived from each department or line of business shall be paid to the patrons of the said corporation as a patronage dividend, proportionately to the number of bushels of grain delivered to the elevator by them. Provided, that the patronage dividend earned by patrons not owning stock shall be applied on the purchase price of one share of stock in this corporation at its actual value, not less than par; and if said dividend is not sufficient to pay for said stock then the balance may be paid for in cash by said patron, but if the balance is not so paid for in cash said stock shall not be issued until future patronage dividends shall have been earned and applied in sufficient amounts to pay the balance remaining unpaid.''

Many of the cooperative elevator companies are developing other departments or lines of business besides that of handling grain. They handle and sell seed grain, coal and building material. A more recent development is the formation of a department for the cooperative shipping of live stock. The development of these side lines involves the investment of very little additional capital but adds materially to the volume of business of the companies and benefits derived.

The benefits derived by the patrons of cooperative elevator companies may be summarized as follows: (1) The distribution of dividends on a patronage basis. (2) It has reduced the margin between the local and terminal price of grain considerably per bushel and has therefore increased the price paid the producer by same amount. (3) Cleaning plants are installed so that grain containing various weed seeds, foreign material and light grain can be cleaned before loading it into cars and the screenings are either returned to the owner or sold as feed. This makes a by-product of tremendous volume and represents a saving in freight and value of product.

It is apparent that the cooperative elevator movement in North Dakota is going to be one of magnitude and powerful influence in an economic way. Many agencies are at work educating the farmers to a better understanding of applying modern business principles to their farming operations and to their organizations for marketing. Such education has resulted in a much greater degree of success attained in the operation of cooperative enterprises than was formerly possible. It is significant therefore that the cooperative elevator companies organized on the cooperative plan of doing business and in accordance with modern business methods are a source of great benefit and satisfaction to their patrons thru the creation of better local marketing conditions in the nature of better prices, the use of by-products and the handling of the business in a strictly cooperative way. The cooperative elevator therefore is solving the problem of local marketing of grain and other farm products and it is gradually expanding into other lines of marketing and trading.

Educational Aspects of Botany

Ernest S. Reynolds, Associate
Professor of Botany

There is a readjustment of life taking place thruout the world and education must endure a much more careful scrutiny than it has ever been given before. We find that in a broad consideration of the subject two main tendencies have found expression in American education. The older one placed the entire emphasis upon the culture which would easily make a sharp line of demarcation between the ``educated'' and the "uneducated" man. A more recent tendency is toward complete vocationalizing of school work and toward the exclusion of everything that does not have an immediate "practical" bearing, which seems usually to mean financial gain. One of these tendencies is as dangerous as the other for both lead to class education, with profound ignorance of the vital facts of other men's lives. President Faunce of Brown University has well said, "If we educate the man for the job, and for the job alone, there will be one set of men to work with their hands and another set of men to work with their brains. This is a condition that no American community should tolerate. It means the permanent stratification of American society. I want to educate the man for his life as well as for his living. The schools should give not simply skill; they should give right habits, methods and ideals."

In any contemplated changes in a system of education both the cultural and the vocational ideals must be considered. It has been said "Our modern experience proves conclusively that there is no great difference in the value of subjects of study. Any subject really worth study, if pursued long enough, will give power and culture. No subject can give either of these results if studied but for a short time." In so far as any subject will give general "training" all subjects will be effective in the same way, but modern psychology seems to teach that there is little to such general training in any case. If this is so then "power and culture" will be proportionate to the value of the contents of each subject. Now the value of the subject matter of a study depends upon what use is later to be made of it. Every citizen has two functions to perform and the selection of subjects for study depends upon these two functions. The first of these functions, and the one for which the school system is chiefly maintained in a democracy, is to be an intelligent citizen. President Hibben of Princeton has said, "Patriotism is something more than a sentiment, however enthusiastically expressed. It is something more than saluting the flag or singing America and the Star Spangled Banner. Patriotism is consciousness of obligation and readiness for sacrifice." This "consciousness of obligation" is aroused and intelligently guided by a proper educational system. "The notion of 'duty' must have as large a place in the meaning of democracy as the notion of 'rights,' and not the least important of democratic duties is the duty of intelligence." This sentiment expressed by Professor Bagley finds its concrete expression in the school subjects which prepare directly for intelligent voting, such as economics, civics, history and sociology, as well as in those which prepare the student to understand the great questions of public health, standardization of foods and manufactured products and so forth.

The second function of every citizen is to be a productive unit in society and for this the vocational subjects find their chief excuse. The danger of turning this function into a kind of class or guild education has been mentioned and it is only as the curriculum of studies provides fully for intelligent training of the function of good citizenship that the danger from vocationalization of our schools is to be eliminated. This nation needs well trained mechanics less than it needs to have all of its citizens well versed in the principles of a good government providing justice and opportunity for all. It is a matter of good fortune that many of the subjects which are essential for the production of good citizenship are also essential for the development of well trained artisans. The reason for this is chiefly that many of these subjects are fundamental to many types of education. Miss Mary E. Woolley says, "In the light of the pronounced interest in vocational training, it is perhaps not amiss to remind ourselves that the first essential to efficiency in any vocation is that which is essential to the stability of a building—namely a good foundation. A strenuous, complex, and democratic century calls for a well-equipped human being." It is one of these foundational subjects which I wish to describe. It will be seen by the reader that the subject of botany helps to provide training for both of the functions of the individpal,—good citizenship and good artisanship.

Botany has often been referred to as an observational science and while at one time that was its chief characteristic it is as experimental in nature now as it is observational. Both of these types of study are well illustrated by this science and it is valuable in any curriculum for the experience which students get with these two methods of gaining information. While it is an open question whether a student gets a general ability for observation by studying an observational science, yet the value of the experience gained from a course which insists upon accurate observation cannot be doubted. As an experimental science it gives the student experience in setting up an experiment and drawing logical conclusions from the results. In this it is superior even to chemistry since more opportunities for false reasoning present themselves and must be guarded against.

The actual information gained from botanical study is also of inestimable benefit as one may readily see from a perusal of the many fields in which botany furnishes foundational principles and facts. No person's education may be considered well rounded without at least an elementary knowledge of the great facts of the immense importance of plants to man. To know that no life could exist without plants and why this is so is of as much importance in the mental equipment of anyone as any of the great facts of science. An intelligent understanding of the great question of how we live cannot be gained without this fundamental botanical knowledge. To be sure, man may live with a very limited knowledge of "how," but the intellectual delight of knowing cannot be complete without the facts of this science.

In yet another important matter botany is necessary for the intelligent citizen. Many matters of legislation and of custom are bound up with botanical facts and great injustice and injury may be done by one who is ignorant of these matters. This is increasingly important as American people wake up to their duty to take part in the democratic governing of the nation. When lawyers only took part in these affairs the matter of justice to all was of slight import, and ignorance of scientific facts was the rule, even tho many might suffer as a result. In our more civilized life which is just ahead, in which all citizens will take an intelligent interest in government, the democratic spirit demands that justice shall be done to all. Justice can only be done when action is founded upon accurate knowledge; and botanical knowledge, or at least an appreciation of the importance of such knowledge gained while in elementary contact with the subject, must be the inheritance of each citizen.

That this science is capable of developing the reasoning, philosophical powers of the mind and rounding out one's nature thru the love of the beautiful, should not be overlooked in estimating the value of the subject in education. An exhaustive treatment of this whole subject would demand a much larger space than is available for this article, so that the intention of the writer is merely to introduce the reader to a train of thot which may be carried out to much greater detail. One may grant that all of the above and much more is true concerning the subject, yet wonder what inducements there are for one to enter the field for a life work. Here again a few suggestions will be helpful in directing the reader's thot.

It is a recognized principle in a democracy that all citizens should be useful, or in other words be of service to the nation. The botanist may well claim that he is of great and direct service to the community. Numerous positions as teachers and investigators in various aspects of botany are open, and as the nation realizes the remarkable contribution which this subject may make to the welfare of the citizens many more such positions will be open, as well as better remuneration for the work. Foresters in both private and public reserves are increasing in number and in many industries botanists are being employed to help solve industrial problems. In the great corporations dealing in rubber and other products of this nature botanists are employed, while the larger pharmaceutical establishments are also employing men and women trained in botanical methods. The special fields of study such as plant diseases, horticulture, and plant breeding are demanding increasing numbers of trained botanists. Private estates and public gardens, commercial fruit farms and many other private commercial agricultural companies are beginning to use trained men to help reduce loss thru plant diseases. It is said that over a thousand botanists are employed in the national and state experimental and teaching work. The salaries depend in part upon the training, experience and ability of the individual. As the importance of the work becomes more widely known the remuneration will be more liberal, tho at present, as in all educational work, the pay is relatively poor as compared with many commercial positions held by men of no greater ability, training or experience. The enjoyment gained from the work will always remain a part of the compensation which even poor paymasters cannot entirely take away. It remains to be told what the agricultural college is doing to meet the need for botany in education and in training specialists in the subject.

To supply the demand for botany as an educative force in general education nearly all students are expected or required to take at least the elementary course which is an introduction to the various aspects of the subject. Here the fundamental notions are emphasized and an acquaintance is gained with the various kinds of plants and how they live. Since the agricultural students require these fundamental ideas they too enter this course and follow it in the junior year with one in which the life principles of crop plants are particularly emphasized. The diseases of plants are studied in another course which is elective for all who are prepared to profit by it, especially the agricultural students. Pharmacy students receive special training for their work in a separate course. The advanced courses provide for training students in plant pathology, physiology and classification as well as the applied work in seed analysis. A carefully outlined series of courses may be elected by a student after his freshman year which will prepare him for holding a position as assistant in botanical work, or for post graduate work in botany which will lead to some of the principal positions open to botanists. Post graduate work in botany is offered leading to the master's degree, and may be pursued in any of the major lines mentioned above.

An article by Dr. Reynolds on practical applications of botany will appear later.—Editor.

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Teacher Shortage

The economic position of the teacher had been one of the weakest among the occupations, and war conditions led to withdrawal of many teachers from the profession. Here in North Dakota a former high school principal at eighty dollars a month was reported as having left teaching to become a laborer in a lignite coal mine at two hundred dollars a month. Analogous if not equivalent substitutions of employment have left teaching with an inadequate force of workers and with a related tendency to low preparation for teaching. There is scarcely a public question more important than how to build up the teaching personnel.

Quality in Method

An English visitor of American schools says that the English boy writes better than the American college boy because the former has been taught to think better. Educators have long realized that with all its faults English higher educa tion has fostered a highly analytical type of thought and discussion There is a particularity and a sureness in the English culture, especially as revealed in the literary field, that should be a suggestion to us in the midst of perhaps too great haste to "cover" subjects.

The Vocation of Pharmacy

W. F. Sudro, Professor of Pharmacognosy

Wootton, in his Chronicles of Pharmacy, gives an excellent description of the origin of medicinals or drug substances when he states: "Pharmacy, or the art of selecting, extracting, preparing, and compounding medicines from vegetable, animal and mineral substances, is an acquirement which must have been almost as ancient as man himself on earth. In experimenting with fruits, seeds, leaves, or roots with a view to the discovery of varieties of food, our remote ancestors would occasionally find some of these, which, tho not tempting to the palate, possessed this or that property the value of which would soon come to be recognized. The tradition of these virtues would be handed down from generation to generation, and would ultimately become, by various means, the heritage of the conquering and civilizing races.

The art of the apothecary, or of pharmacy, restricted to its narrowest conception, consists particularly of the manipulation of drugs, the conversion of the raw material into the manufactured product. The records of this art, and the mystery likewise go back to the remotest periods of human history. In the course of ages they become associated with magic, with theology, with alchemy, with crimes and conscious frauds, with the strangest fancies, and dogmas, and delusions, and with the severest science. Deities, kings, and quacks, philosophers, priests, and poisoners, dreamers, seers, and scientific chemists, have all helped to build the fabric of pharmacy.''

The earliest medical practitioners of any sort and among all peoples were herbalists, as we should designate them; women in many cases. How they came to acquire knowledge of the healing properties of herbs it is futile to discuss. Old writers often guess that they got hints by watching animals. Their own curiosity, suggesting experiments, would probably be a more fruitful source of their science, and from accidents, both happy and fatal, they would gradually acquire empiric learning.

These herb experts then would begin to prepare their own remedies so as to make them easier to take or apply, making infusions, decoctions and ointments. Thus the art of pharmacy would be introduced.

The herbalists and pharmacists among primitive tribes would accumulate facts and experience, and finding that their skill and services had a market value which enabled them to live without so much hard work as their neighbors, they would naturally surround their knowledge with mystery, and keep it to themselves or in particular families. The profession of medicine being thus started, the inevitable theories of supernatural powers causing diseases would be encouraged, because these would promote the mystery already gathering around the practice of medicine, and from them would follow incantations, exorcisms, the association of priestcraft with the healing arts, and the superstitions, credulities and impostures, which have been its constant companions, and which are still too much in evidence.

From this dual personality then, there gradually arose the pharmacist proper and the physician, the former to whom was delegated the preparation of medicinals and the latter to whom was entrusted the administration of the prepared substances.

With the advent of time new remedies were gradually added to the materia medica, new discoveries were constantly being made in medicine, new and intricate processes for the preparation of medicinals were devised, and responsibilities, both of a legal and moral nature, were made binding upon the apothecary.

Thru all this transitional period we also see a gradual increase in the intellectual requirements of the calling. This is clearly indicated by the organization of the Paris apothecaries into a guild, which, shortly before the revolution, was changed into a college of pharmacy, both of which were closed corporations. These institutions became disorganized with the revolution, but a later manifestation of this same spirit is found in the cooperative organization known as the Central Pharmacy of France.

The first pharmaceutical educational movement in this country found expression in the establishment in Philadelphia of the Philadelphia College of Pharmacy in 1821. This was followed soon after by the organizing of local colleges of pharmacy in the larger cities of the east, later also west of the Alleghanies. These colleges were organizations of local druggists established primarily for their mutual protection and the improvement of their calling. In the long run it was proved that local control of pharmacy was inadequate and ineffective, and for that reason was gradually displaced by state supervision and control.

State legislation controlling the practice of pharmacy in this state was enacted in 1887, two years before statehood. This measure was repealed and replaced by the present pharmacy law, which was enacted in 1907 and subsequently amended. Two types of pharmacists are recognized under the state code, viz., registered and assistant registered pharmacists. Only registered pharmacists may be placed in charge of pharmacies or stores for the sale of drugs and medicines. An assistant registered pharmacist may be left in charge of a store only during the absence of the registered pharmacist.

An applicant for registration as assistant pharmacist must have had at least two years' experience in a reputable pharmacy under the instruction and supervision of a reputable pharmacist and also must be at least eighteen years of age. Six months of the two years' experience required may be spent by the applicant in a regular course of study in an approved college of pharmacy.

An applicant for registration as pharmacist must be twenty-one years of age, must have had at least two years of practical experience in a reputable pharmacy, and must have graduated from a school or college of pharmacy approved by the state board of pharmacy.

Inasmuch as the state assumed control of pharmacy it was imperative for the state to provide suitable educational facilities. This was accomplished by the establishment of courses in pharmacy in the educational institutions of the several states, such as the universities and the agricultural colleges. In our own state provision was made in 1901 to teach pharmacy at the state agricultural college. The board of trustees, being petitioned by the druggists of the state, gave sanction for the organization of the department of pharmacy which has recently been reorganized as the school of pharmacy.

Two courses are offered at the school of pharmacy. The one known as the practical pharmacy course requires two years of attendance on the part of the student. To register in this course a student must have completed at least two years in a high school. The successful completion of this course prepares the student for the state board of pharmacy examination. The material offered in this curriculum is of a purely practical nature. A few strictly cultural courses are included but the course deals chiefly with all phases of chemistry, pharmacy, and materia medica as required in the practice of pharmacy. The degree of graduate in pharmacy (Ph.G.) is given for this work. The educational entrance requirements will soon be increased to three years and in the course of time to four years.

The second course offered by the school is known as the course in pharmaceutical chemistry and extends over a period of four years. The requirements for admission are the same as for the regular college courses, viz., the candidate must have graduated from a first class high school or must offer the equivalent in credits. The course includes all the work given in the two-year curriculum and also advanced work in the different branches. While the two-year course prepares the student for actual drug store practice, students are recommended to take the four-year course as the extra work given will more than compensate for the time and money spent.

The state is very fortunate in having the school of pharmacy located at the agricultural college as the food and drug laboratories are also stationed here. To a student who is contemplating advanced work such a combination is very advantageous as the student is given the opportunity of learning directly the methods used in determining the purity of foods and drugs.

There are several factors which tend to make pharmacy a promising calling. The profession is by no means an overcrowded one. There is a decided scarcity of drug clerks thruout the entire country. In this state the situation is critical but the condition is more deplorable in the east than in any other section of the country. With the small number of clerks available and the demand for them universal it is not unreasonable to expect that salaries would materially advance. Such is the condition existing at the present time.

But the graduate may aspire to higher prospects in that drug store managers, especially those who are competent and resourceful, are in great demand and may command almost any salary commensurate with their ability. As proprietor the graduate may reap greater rewards for the amount of success will be dependent chiefly upon the amount of endeavor expended.

Pharmacy, as usually interpreted, is of a dual nature for it is a profession and a commercial business proposition in one. There is no other calling which may be likened to it. To become a successful pharmacist requires good, sound business ability combined with excellent professional training. Besides the pharmacist must be possessed of a strong moral nature for his responsibilities are many. To the young man or woman contemplating their life work pharmacy should appeal very strongly.

If the graduate does not look with favor upon entering the retail drug business there are many other avenues open to him. The manufacturing field is a broad one and includes positions in manufacturing proper, in investigational work to improve products and processes, in analytical work to control the purity of the products, etc. Also manufacturers and wholesalers are relying more and more upon college graduates in the sales departments, for a man to be a successful salesman must first know the product he is selling.

Since the advent of the food and drug laws there has been an active demand for chemists and investigators to fill the various positions thus created. Chemists are needed to determine the purity or authenticity of foods and drugs. Inspectors are required to make sanitary inspections of all places of business where food is handled. Other workers are in demand to fill the clerical positions for the proper administration of the various laws. Pharmacy graduates, by virtue of their training, are very well equipped to fill these positions. However in entering the manufacturing or scientific field the student should select the four-year course as by so doing he will be better prepared for the work in hand.

There is probably no field of endeavor which is so suited to women as pharmacy. Women, as pharmacists, have made a decided success. There are many factors which have contributed to this, among which may be mentioned the following. The work in a modern pharmacy or drug store is what may be termed "light" in nature. That is, the articles dealt in are usually light in weight and require but little manual labor in their manipulation. The work is a clean one in every sense of the word and is free from any disagreeable features which characterize so many other lines. Again, many preparations, such as toilet supplies, perfumes, etc., mainly used by women, could be sold to good advantage by women clerks. Also, woman appears to be endowed with that sense of artistry which can be used very profitably in a drug store. This artistic appearance is sadly lacking in many stores, therefore a woman clerk could very advantageously use her talents in this direction.

Fifty percent of the North Dakota School of Pharmacy students this year are women. Other pharmacy schools report varying percentages. Women are found in all the fields of pharmacy, as clerks and proprietors, as chemists, investigators, saleswomen, etc. Many examples could be cited of women engaged in pharmacy, from the humblest beginner to the late Miss Cora Dow, who operated and owned a chain of eleven stores in Cincinnati.

The school of pharmacy of this state offers to the young man or woman an excellent training. The curriculum of the school is first class in every particular as is evidenced by the fact that the New York state educational department lists it among the registered schools of the country. The facilities offered are excellent while the expenses are moderate. Pharmacy offers you an exceptional opportunity. It is yours for the taking.

Some Practical Applications of Botany

Ernest Shaw Reynolds, Associate Professor of Botany

Since botany is a study of the fundamental principles of plant life it has many and varied applications in our modern, complex society. One naturally thinks of agriculture in its varied aspects as the subject in which botany finds its widest application, yet probably few realize in how many ways this is true. A very important phase of botanical study is the determination of how plants grow and the needs of plants for their best growth. This finds its direct applications in the adoption of the best cultural methods; time, method and kind of fertilization; and increasingly in the proper irrigation of the land. The study of methods of plant reproduction leads to the production of larger fruit and seed yields, as well as to a steady improvement of the agricultural varieties by methods of breeding based upon a knowledge of the botanical principles of reproduction. Incidentally many of the principles of animal breeding are worked out upon plants by plant breeders and then applied to animals. An example of increased fruit production is seen in the case of strawberries which upon examination are often found to produce only flowers with pistils and no stamens for pollen. In this case it is necessary to plant other strawberries which do produce pollen in order to have fertilization take place, as otherwise no fruit would be produced. The study of plant diseases is a botanical subject, since the minute organisms which cause the majority of these troubles are plants; the crops which are affected are plants which must be studied to know just what is the damage done and the remedies to be applied must be based upon a knowledge of these two classes of plants and upon a knowledge of how the treatment will affect the diseased plant. Plants growing together in a promiscuous fashion have a profound influence upon one another, which is a subject of study in botany. The results of this study have very practical bearings upon the growth of crops under field conditions. The study of seeds and their germination has been used as the basis for the good work in the pure seed laboratories, and many more problems associated therewith have yet to be solved by botanical studies. Thru the study of the methods by which plants naturally propagate themselves there have arisen the numerous methods of grafting, layering, making of cuttings, etc. The elimination of weeds is an end much to be desired in agriculture, and the study of this problem is based upon a knowledge of the weeds, their nature, means of spreading, effects upon the crops, and the effects of the crops upon them. In each of the above cited examples a knowledge of botanical principles is essential to an effective study of the problem, and these are only a few samples of the many questions in the cultivation of crops which must be answered by botanical study.

Closely allied to the problems of crop production are those which have to do with the dairy industry. Here also, strange as it may seem, botany is of great importance. Every well regulated dairy farm must be its own feed producer and all of the types of questions involved in crop production necessarily apply to crops primarily used for feeding dairy animals. More directly also botany fills a need of this industry. The production of the various types of cheese, for example, depends upon the growth of certain minute plants known as fungi in the milk products and the injuries to these products are usually due to other fungi. These fungi must be studied and recognized so that the beneficial kinds shall be definitely known and the injurious ones as well. The conditions under which each will develop best must be discovered in order to eliminate the one and encourage the growth of the other. Other dairy products, in like manner, depend upon other plants either for their flavor or condition, and these plants are the subject of study in botany.

Much of what has been said concerning agriculture similarly applies to its recently developed branch, forestry, or even with greater force; while the various branches of horticulture likewise depend greatly upon botany. Many processes in all phases of agriculture depend upon an intimate knowledge of those ubiquitous organisms called bacteria, that help to modify the soil; the health of animals and plants; the animal and plant products such as milk, meat, ensilage and sauerkraut; and in many other ways modify the farm processes. This whole subject, originally founded upon botany and a part of it, has attained a distinction of its own and is known as bacteriology, but is still in many ways closely interlocked with botany and dependent upon botanical methods and principles.

In the fields of medicine and pharmacy botany exerts a strong influence, for most of the drugs are of plant origin. Not only must a sure knowledge of the plants which produce these drugs be gained, and new ones discovered and tested, but also many of them are produced in cultivation. Here the best methods of culture depend upon botanical principles, and the effects of different methods of culture and varieties upon the drug producing power of the plants must be studied from a botanical viewpoint. Deterioration of drugs and the causes of special physiological action upon the patient are partly botanical problems. It must not be forgotten either that the causes of most diseases are bacteria. A recent development in the study of the crown gall of plants has shown the possibility of a botanical problem throwing a good deal of light upon certain human diseases, for this plant disease shows so many characteristics similar to cancer in animals that important methods of study of the latter disease have been suggested. Poisonous plants, hay fever plants and other special plants which affect few or many people must also be studied by botanists as well as physicians, which fact reminds us that not so many years ago many doctors and druggists were prominent botanists.

The engineer would seem as far removed from the province of botany as any specialist in modern life, yet the recent war has simply emphasized a truth well known before, that the life and health of many persons may depend upon a small botanical fact. The structural characteristics of wood are extremely important in the building of bridges, buildings and many other structures. The botanical knowledge of various kinds of woods became very important in the manufacture of aeroplanes, while a slight streak in the piece of timber revealing the presence of certain fungous rots was sufficient to cause the rejection of the wood. The preservation of articles and structures made from wood is necessitated by the almost universal presence of rot producing fungi, and the methods of preservation are dependent upon the characteristics of these same minute organisms. In these and other ways botanical knowledge becomes the foundation of many engineering practices.

In various industrial fields also botanical training and knowledge are very important. It may be sufficient to remember that flax, cotton, jute, hemp and manilla are all plant products, that their quality and quantity are greatly influenced by factors dependent upon a knowledge of their botanical characteristics and that in their preparation for the market processes are used which also depend upon botanical knowledge and principles. Rubber and other plant products are of such value and necessity that both governments and corporations make special effort to increase production by employing botanists to breed new varieties of plants and to find new kinds of plants producing them. During the war our government entered into special contract with many planters in the south to raise castor beans because of the need of the oil for aeroplanes. The manufacture of many articles of industry is dependent upon the botanical properties of the plant products and many substitutes and new products are sought thru botanical explorations in foreign lands and botanical investigation of domestic plants. Gums and resins for varnishes; cellulose for artificial silk, syrup, gunpowder and numerous other products; oils for various industrial purposes; coloring matters and tannins for many uses; and numerous other plant products used in various manufacturing processes are simply examples of substances which are often discovered in the round of botanical investigation and which must be studied in their botanical relationships in order to obtain them in economical manner and to lay the foundations for further search for other useful products.

The above enumeration of some of the ways in which botany touches the lives of all of us in our modern life is sufficient to justify the position of botany as a practical subject in an agricultural, medical, pharmaceutical, engineering or industrial curriculum, since it is foundational to all of these as well as giving rise to knowledge which is of use in further advance in these fields of activity. There is, however, another justification for the presence of this subject in our educational program. It is of great use in both technical and non-technical schools as an educative force.

Expansion of Steel and Concrete

R. H. Slocum, C. E.

Five naughts sixty five (0.0000065) is an interesting little number. It tells the engineer how much of a gap to leave between the ends of railroad rails or what movement to allow for in expansion joints in heating mains. The designer uses this to determine how many expansion joints to put in a concrete wall or pavement. This number is known as the coefficient of expansion for steel or concrete. In other words it is the proportional elongation for a change in temperature of one degree Fahrenheit. Thus a steam heating main may have a change in temperature from zero degrees to 225 degrees F. and have a free length of 200 feet. The unrestrained change in length would be 200 x 0.0000065=.0013 feet per degree and .0013 x 225=.2925 feet or about 3½ inches total.

The change in length of a 30-ft. railroad rail between winter (-40 F.) and summer (+120 F.) conditions would be 0.0000065x160x30=.0312 feet or about ⅜ of an inch.

An insufficient allowance or the neglect of this factor leads to undesirable conditions. Sometimes the structure gives evidence of distress such as buckling in sidewalks, humps in pavements or track out of alignment. This is due to expansion. The same coefficient applies to contraction and is evidenced by fence and telephone wires tightening in cold weather and some of the cracks that appear in concrete walls and floors.

This property of steel is utilized in various ways by mechanics. A most common use is that of setting tires by the blacksmith.

The engineer's problem is to prevent the destructive effects of this property of material. Bridges of long span have one end supported on rollers. Shorter spans often have sliding plates at one end. Pavements, curbs and sidewalks should be provided with expansion joints. There are numerous situations where expansion joints are undesirable or impracticable.

When a piece of steel or concrete is loaded it either shortens or stretches according to the position of the load. This change in length produces an internal stress. If the piece tries to shorten due to lowering temperature but is prevented, an internal stress is produced by the load in one case and prevented by applied forces in the other. It is the engineer's problem then to design so as to meet either situation. In the first case the load is usually apparent. In the second the presence of internal stresses may not be even suspected by the layman or the "practical" engineer.

In structural steel design it may be necessary only to make the members enough heavier to take the temperature stresses. In concrete work expansion stresses (compression) may be taken directly by the material which has a high compressive strength. Concrete is very low in tensile strength. Contraction stresses (tension) are usually taken care of by steel rods placed in the concrete. Without the rods the concrete would fail in tension. The stresses would be relieved and the shortening would all be localized in the crack at the place of failure. The steel rods distribute the stresses thruout the length and prevent localization. They do not do away with the stresses due to temperature changes.

Since the steel and concrete have practically the same value for the coefficient of expansion the two materials work in harmony. If the materials had widely different coefficients the use of reinforced concrete would be impracticable. The steel and concrete would distort unequally with changes of temperature and the structure would wreck itself.

This leads to the conclusion that in design the little things must be taken into account. This is perhaps the distinguishing characteristic of the expert or accomplished man in contrast with the rule-of-thumb man or quack. "Profits begin with the plans" might well be a slogan for the prospective owner, builder, capitalist or municipality.

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Medical Inspection in the Rural Schools of North Dakota

Mabel M. Hollis

Until very recently it was generally thought that country children were much more healthy than city children. This no doubt grew out of the fact that the health conditions of the country were less fully known, and it was the natural conclusion that the abundance of fresh air, sunshine, and outdoor life of the country assured good health. One of the first and most conclusive surveys which disturbed this idea was the one made in a rural district of Virginia, comparing it with the slum district of New York. The evidence was startling because it showed that in the case of tuberculosis, for example, the death rate in the so-called lung block of New York City was 1% while the death rate in a rural county of Virginia was 3.7%.

Dr. Thomas D. Wood of Columbia University, chairman of the committee of the national council of education, says that the country child is from 15% to 20% more defective than the city child. He also states that 12.000.000 or three-fifths of the school children of the United States attend rural schools. The following table, prepared by Dr. Wood, shows some results that are instructive and is based on all available material from reports of over a half million children.

City and Country Children Compared
Percentages of Defects From All Available Statistics

	City %	Country %
Teeth defects	33.58	48.8
Tonsils	16.42	28.14
Adenoids	12.5	23.
Eye defects	13.4	21.
Malnutrition	7.65	16.6
Enlarged glands	2.7	6.4
Ear defects	1.28	4.78
Breathing defects	2.1	4.2
Spinal curvature	.13	3.5
Anemia	1.5	1.65
Unclean	.17	1.7
Lung defects	.32	1.25
Heart disease	.40	.74
Mental defects	.2	.8

Dr. Wood states that there are 20,000,000 children in the United States or 75% that need attention for medical defects which are prejudicial to health and which are partially or wholly remediable. His figures are as follows :

Per cent	Number	Defect
1½ to 2	400,000	Organic heart disease
5	1,000,000	Spinal curvature
5	1,000,000	Defective hearing
25	5,000,000	Defective vision
25	5,000,000	Malnutrition
30	6,000,000	Enlarged tonsils, adenoids
50	10,000,000	Defective teeth

The present status of health work in the United States in the city and rural schools is summarized as follows:

400 cities have medical inspection
13 states with 130 counties have rural inspection
50 city clinics
1 rural clinic, in St. John Co., Fla.
750 nurses in 135 cities
12 nurses in 20 rural districts

The foregoing material gives some idea of the movement in the country as a whole. It will be interesting to now look more closely at conditions as they exist in the state of North Dakota.

Medical inspection was in practice in the larger towns and cities of North Dakota before it was in the open country. In 1914 the county of Grand Forks hired the first rural school nurse in the state. In 1915 LaMoure county followed the good example and hired a registered Red Cross nurse for full time service.

In 1917 the state legislature passed a law permitting any board of county commissioners to employ a school nurse or physician at county expense on petition of two-thirds of the school directors.

In the fall of 1917 the State Supt. N. C. Macdonald conducted a statewide series of rural school rallies in which he took a corps of workers to meetings of all the teachers and directors of each county in the state. A number of prominent educators from outside the state took part, among them, Dr. J. M. McBrien of the U. S. bureau of education, and Dr. A. E. Winship of Boston. The school nurse problem was one of the important features of all these meetings. Some idea of importance of this campaign may be gained from the statement of Dr. A. E. Winship that he regarded it as the greatest rural educational campaign that any state had ever conducted. As a rule, the directors assembled passed resolutions indorsing the county nurse. At the close of the campaign the state superintendent was able to report that the school directors of a majority of the counties of the state had presented legal petitions for the employment of a county nurse.

There are five distinctive methods in use in the state for the inspection of school children in the country:

Full time county nurse (Grand Forks, LaMoure and Dickey counties).

Part time county nurse (Williams county).

Doctors from various communities (Cass county).

Health picnics (McHenry county).

Teachers in each school (Bowman and Wells counties).

There are advantages and disadvantages to each of the above mentioned methods of carrying on this work. When teachers do the examining only the most obvious defects are noticed. Parents do not give as much weight to the diagnosis of the teacher as to that of a doctor or nurse. However with unusual cooperation and assistance on the part of the health board and local physicians a great deal of good can be done.

In the case of the health picnics the parents are present and are impressed with the importance of the work, as well as see the examinations and hear the verdict of the examiner. But there is likely to be a haste and confusion at such an occasion which is not wholesome. The primary object of these picnics was to stimulate interest and act as a forerunner for the employment of a nurse.

When various doctors examine in the different districts there is no uniformity of report and no follow up work, which according to the testimony of all who have had experience with this plan is a serious handicap. In some districts practically nothing has been done. Judged by the experience in Cass county, the work of each district seems to depend on the initiative of the physicians, and there seems to be no organizing head to the machinery.

Employment of the full time nurse or doctor is the ideal system as the reports are uniform, the work is under close supervision and the follow up work is careful and continuous. As an example of this the experience of the city of New York might be cited. Until 1908 the doctors did the examining and postal cards were sent to the homes of defective children, and they got action in only 6% of the cases recommended for treatment. Then the board of education employed school nurses and got 84% of action immediately. One nurse is allotted from 1,000 to 10,000 children. In New York City 4,000 is the average while in Philadelphia it is 5,000. An average of one nurse for each 1,000 children is more nearly ideal, says Dr. Wood.

The work in Grand Forks county was so unique and successful that the U. S. bureau of education issued a special circular on it. Here is a report showing the typical school in Grand Forks county in 1914, as far as health conditions were concerned:

Pupils examined	73
Defects of eyes	10
Defects of ears	3
Enlarged tonsils	14
Adenoids	6
Pupils with decayed permanent teeth	20
Enlarged glands	2
Granulated eyelids	3
Total defects	58 or 82%

Typical rural school report from Grand Forks county for 1914:

Pupils examined	22
Defective visions	8
Defects in hearing	1
Enlarged glands	2
Decayed teeth	12
Enlarged tonsils	6
Adenoids	2
Total defects	31 or 150%

Reports from the county of Grand Forks as a whole:

Year	Pupils examined	Defects	%
1914-1915	2413	1986	82
1915-1916	2500	1625	65
1916-1917	2270	809	34
1917-1918	2618	738	28

In the four years' work the defects decreased from 82% to 28%. This was a result of careful follow up work. In some cases the county bore the expense of caring for children whose parents could not afford to do so.

In LaMoure county, where the school nurse system is used, the work is similar and equally efficient. The following report shows what has been accomplished in the last two years:

1916-1917	
Defective vision	187
Conjunctivitis	115
Defective hearing	82
Nasal obstruction	428
Enlarged tonsils	526
Cervical adenitis	195
Defective teeth	874
Ringworm	68
Pediculosis	21
Goitre	175
Deformities	51
Malnutrition	163
Total defects	2885
Number of children examined	1814
Defects corrected	736 or 40%
Home visits	338

1917-1918	
Number of children examined	1994
Defects found	2297
Defects corrected	504 or 20%

A very important and interesting outgrowth of the county nurse work done in LaMoure county is shown in the report of the care of the following cases at the expense of the county:

7 cases operated upon for adenoids and enlarged tonsils

1 case fitted with glasses

2 cases operated upon for acute appendicitis

1 case operated upon for web fingers and supernumerary toes

9 cases of trachoma taken to the government hospital at Pikeville, Ky.

1 feeble-minded girl taken to Grafton, N. D.

1 tubercular boy taken to Dunseith, N. D.

1 blind girl taken to Bathgate, N. D.

2 deformed children taken to Mayo clinic for treatment.

The county commissioners appropriated funds to carry on this work without expense to the parents in cases where it was necessary.

A quotation from a letter received shows another outgrowth of the county nurse work in this particular county: "Fifteen months ago we found that trachoma existed in our schools, and nine children who were almost blind from the disease were taken to the government hospital at Pikeville, Ky., for treatment. They were under treatment for nine weeks and returned cured, and have been attending school ever since. The commissioners then petitioned the government to make a survey for trachoma. Major Oakley of the U. S. public health bureau made a survey during May and June. He examined six thousand people, found one hundred and twenty-five advanced cases and three hundred and twenty-seven suspicious cases. The commissioners then petitioned the surgeon general to establish a government hospital here for the treatment of trachoma. Accordingly a hospital was opened here Dec. 13, 1918. The county furnishes the building, the state contributes twelve hundred dollars a year, and the federal government pays the remainder of the expenses. The hospital was filled with patients immediately and the waiting list became such a long one that it was found necessary to build an addition to it recently. Any patient from any place in the United States is admitted upon application to the surgeon in charge. Treatment and maintenance are both free of charge."

Other phases of health work done by the county nurse are,—hygiene talks in the schools and at clubs and parents' meetings, hygiene contests, home visits, baby clinic work, anti-tuberculosis work, and in fact safeguarding the health of the entire county. LaMoure county is starting "nutrition classes" in all the schools this fall to combat the existing malnutrition among the children. Every child will be weighed and measured each month, special instruction in diet will be given to the children and the parents.

The legislature of 1919 changed the law of 1917 on medical inspection slightly, making it compulsory where it was optional before and reducing the two-thirds petition to a majority. It also puts the examining nurse or doctor under the supervision of the county board of health. Since the county superintendent is one of the members of the county board of health this need not in any way interfere with the present status of the work.

Note.—In recording defects and corrections in Grand Forks and La Moure counties, where there are defects in impaired organs, as eyes, ears, tonsils, only one defect is recorded even tho both organs are affected. One defect is recorded for teeth, tho several may be affected.

Good Roads in North Dakota

R. H. Slocum, Professor of Civil Engineering

North Dakota is different. Good roads advocates call attention to the wonderful Roman roads where stones three feet thick and hand labor were mostly used. But North Dakota is different in people and politics, times and traffic and facilities for road construction. Again Massachusetts and New Jersey may be cited by advocates of gravel and broken stone roads as models by which to fashion the road building for our state. Hard surfaced roads were built in the eastern states thru densely populated districts and before the real development of the automobile. But again North Dakota is different. Traffic changes have come faster than people. We have jumped to the period of automobiles and motor trucks. This has changed abruptly the nature of the traffic and changed materially the effect of wheels on the road surface. Rubber tires have a peculiarly destructive effect on gravel and broken stone roads. We differ from older states in density of population, soil types, available materials for roads, facilities for drainage, property values, seasonal use of roads and climatic conditions and least of all perhaps in present vehicular traffic. We should not follow blindly the practice of the Romans, of the eastern states, of Michigan or Wisconsin, because our conditions differ in many ways from theirs. Moreover, some of these differences exist within our own boundaries, so that uniform design and construction can not be applied to all parts of North Dakota. The road problem is quite complex. It is not easily solved. There is no best road for all localities. Road improvements are to a considerable extent local problems. They should be solved jointly by people acquainted with the neighborhood and those trained to comprehend the economic and structural development of the highway.

Road development should be based on broad and liberal, farsighted plans. Roads should be built to meet the present needs and developed to meet the coming needs of each community. The ability of each community to pay for its improvements should be a factor not overlooked. While improved roads mean larger loads and greater speed as well as increased pleasure and satisfaction they also mean increased maintenance expense. A 365-day-in-the-year road is desirable. It is also a 365-day-in-the-year upkeep proposition. One cannot expect a road to maintain itself. A high standard of road construction means a high standard of upkeep or a rapid deterioration. This should not discourage the building or improvement of roads but needless waste thru negligence in maintenance should be avoided. A wise investment may turn into a loss by poor management. Establish and carry out a definite policy.

"Profits begin with the plans" may well apply to road work if the plans provide for the future. Regardless of the future surfacing of the road, certain fundamental factors of design are applicable to all locations.

Adequate drainage.—Excess water is the worst enemy of most roads. It is a real enemy but one which can be readily overcome. It is an enemy whether on the surface or in the body of the road. Maintenance of a good surface, free from ruts and depressions will rid the surface of water. Well graded side ditches or under drains will take away the water which would otherwise soften the road from below.

Economical profile.—The determination of the proper profile is the biggest factor in economical highway design. It represents the conditions for the final completion. The road building operations should all be toward this end even tho the completed stage may not be reached for a number of years. By this is decided the maximum grade or steepest slope, the amount of cut and fill of earth work in grading, whether the cut and fill are balanced and the length of haul in grading, waterway of bridges and many minor details of construction.

Minimum width.—This should be determined before the beginning of operations so as to avoid useless work and sometimes the rehandling of dirt. It is folly to dig ditches to be refilled when the road is widened. It is better to leave a good wide berm undisturbed without loss of work. A flat wide top would be comfortable to ride on when smooth but would be undesirable for drainage. A sharp rounding top or crown is both uncomfortable and unsafe to ride upon either with team or auto. While surface drainage is important it should not be practiced to the extent of endangering traffic. Crowning is desirable for drainage but too much is dangerous to traffic.

Safe bridges.—Bridges should be safe in two ways; (1) to carry the loads that come upon them and (2) to have the approaches as well as the bridge itself properly equipped with guard rails. The higher the bridge and the approach fill the more important the guard rails become. In this same connection sharp curves should be studiously avoided at the end of bridges. Culverts should be of such length as to prevent dirt filling the ends and to give safe passage to traffic even outside the nominal roadway. A short culvert the ends of which are covered with vegetation is a menace. Both for safety and utility culverts should be provided with head walls. Permanent construction for bridges should be seriously considered for heavy traffic roads, especially where the country is developed to the point of having accurate knowledge of the required waterway and proper foundations can be reached.

Guarded fills.—The desirability of this feature is so apparent as to need no discussion.

Comprehensive signs.—Road signs may now be considered a necessity rather than a luxury. Signs to be of most value should be easily read, clear in meaning as to direction and distance. They should correspond to guide books and maps of the district. To accomplish this the signs should be systematically placed and cover a large territory. Probably the state would be the smallest unit practicable and cooperation among states would be desirable.

Assuming that we agree to be guided by a definite plan in our road building operations, what is the stage of development to be finally reached? Shall we build a concrete roadway or stop with ordinary earth roads? Shall we pass thru the intermediate stages of gravel and broken stone roads or stop with either of these types of road? Or shall we skip these types of road and build something more substantial at once?

The choice of the final type would doubtless vary with the community and its traffic. Nearly all communities have a large amount of auto travel and probably in time to come even rural roads will have a good deal of traffic carried by motor vehicles on rubber tires. Rubber tires are destructive to the roads depending more or less on a loose fine binder for stability. Also the driving effect of truck wheels on the roads causes rapid deterioration.

Since rubber tires are certain to be a permanent feature in road transportation it would probably be unwise to build a road composed even in part of fine loose material. Brick, concrete and bituminous macadam are types of road which resist the action of rubber or pneumatic tires. It would probably be unwise to build other than this type when it is decided to improve upon the ordinary earth surface.

Summary.—Determine the roadway needs of the ultimate traffic of the community and prepare the physical plans to carry this traffic. Adopt the policy of completing the road according to these plans as rapidly as feasible but especially aiming to reach this completion without wasting money and effort on building and undoing the intermediate stages. Study the local conditions and the materials at hand and make the very best possible use of them. The best road is the one most desired and the best road is the cheapest good road.

Training for Professional Sewing

Amy Campbell, School of Home Economics

Vocational education is a much used and misused term nowadays. But the fact that it is used at all shows the trend of modern educational thought. With the return of the disabled soldiers, many of whom are unfit for their former occupations, the government is applying and expanding the former limited conception of the words, till we find the men re-educated for entirely new occupations. They are being vocationally re-educated.

In the same way the exponents of higher education are learning that the young women of the land must be given more concentrated and specialized training than they have heretofore received. The domestic science schools have taught needlework on a small scale, so that each girl has felt competent to do a little sewing. But the new idea is to give selected students a very special training so that they may go back to their own communities to sew for others. These girls are preparing themselves for a trade, they are receiving vocational education.

We find that today the clothing industry is calculated to be second to the steel industry in value of products. New York and Chicago, two principal centers of trade, are doing enormous businesses. One manufacturer says that the income from the cloak and suit trade in New York City amounted to $150,000,000 last year, one concern alone doing a business of $12,000,000. The present custom house records show emphatically how the business of importation from France which in normal times swells our dress expenditure by millions has been struck flat by the war and the trade filled in with American goods. Since 1914 our importations from France have been cut in half and today there are fewer Paris-made gowns and wraps on sale in the United States than in twenty years. French models which have been brought over with difficulty and personal risk have been treasured by the manufacturing houses for copies.

Up to recent times, a girl wishing such training had to go to commercial institutions. Now it is being introduced into the higher schools of the country. But so far as could be ascertained, the North Dakota Agricultural College is the only institution of collegiate rank which has offered a course in commercial sewing to its students, and has really given college credit for such work. This winter the commercial sewing was given to a class of senior girls, all of whom proved to be most efficient as the course progressed. There has also been a class known as the trade dressmakers, who have given all their time to this particular subject. They have made garments of every description, some for themselves and for members of their own families, and some for customers who have brought their materials and had the garments made to order. A high standard of workmanship has been upheld, just as in a commercial shop, and each girl has felt the responsibility of turning out creditable work.

Some of these students were utterly inexperienced when they entered the class. Now upon the completion of the course, they will be prepared to open a dressmaking establishment of their own, being able to design costumes, draft the patterns, put the garments together in proper style, and give them the finishing touches of the expert needlewoman. It is evident that such graduates will be a welcome addition to the communities to which they will return. And they surely will never become an economic burden to their families, always being able to earn their own living in a most fascinating way.

As a fitting climax to a strenuous term of concentrated effort the domestic art department decided to stage a fashion show which would not only exhibit the garments designed and made by its students but would also be entertaining to persons who would witness it. After considerable study over the question, it seemed best to have something entirely original so that the domestic science department could claim entire credit for the production. The result was the writing of the historical pageant "Milestones of American Fashion," a delineation of the changes in style from the time of the American Indian to the present day. It was hoped that this would be of value in broadening the view of the students, would give them practice in making period costumes, and would allow the modern garments a prominent place in the program.

With the near approach of the important day all classes were working feverishly to complete the costumes for the fashion show. Crinoline girls were seated among billows of flowered materials putting finishing touches on their ruffled skirts even that last afternoon. Pilgrims discovered that aprons and caps could be made with very little effort if you just gave them the right cut. Hats were made by the millinery classes, and a crown of cloth of gold and glittering brilliants was the final touch to the costume of the Spirit of Nineteen Nineteen. Almost every girl of the college had some part in the show, and the interest was intense.

April the seventeenth was a delightful spring day when it was a joy to be witnessing something so appropriate to the season as a spring fashion show. As the music began to sound, Father Time with a charming young girl came slowly across the stage discussing the question of fashions. Finally he offered to produce a panorama of American fashion that she might see for herself how the modern dress excels.

Here was introduced a fairy-like dance symbolic of the passing of the hours. The dancer interpreted the dawning of morn, the brilliant hours of mid-day, the fading hours of afternoon, which ended in sunset and darkness. With her exquisite interpretation she set the standard for the pageant which was to follow. Her costume was made in the domestic art department, graceful and dainty, a perfect combination of materials and colors.

With that the curtain was drawn aside on the Indian girl, the first American, in her lovely beaded gown. In order to make the scenes complete, each was accompanied by singing or dancing. For the students had learned that all of the arts work together to produce the fashions of any age.

Thus the Indian girl sang one of Cadman's songs, the Puritans chanted an old hymn, the Dutch colonial and American colonial representatives danced variations of the minuet. And so it went thru the ages till in the late nineties and early twentieth century. The old popular songs and more modern dances were a fitting complement to the amusing garments which the students had been able to assemble.

The climax of the fashion show consisted of a promenade of the students, each girl wearing the dress or hat which she herself had made. As they walked slowly down the stage and on to the runway which extended out into the body of the auditorium, a prettier scene can hardly be imagined. There were simple gingham frocks, shirt waists, silk dresses, white graduation dresses and party gowns and several charming hats. As they gradually formed a large group on the stage with colors in a harmonious blending, the Spirit of Nineteen Nineteen appeared in the background. She also wore a most gorgeous gown which was designed and made in the domestic art department. Led by this central figure the whole group sang "America the Beautiful," a fitting ending to an evening devoted to the work of young Americans.

This fashion show was indeed a revelation to the audience of the excellent results accomplished by the students of the department under the guidance of their instructors. Altho in Fargo there are no art galleries, no wonderful examples of architecture, no majestic mountains or forests to inspire, these young people had been able to grasp the spirit of art from the printed page and produce costumes which are both graceful in line, harmonious in color and suited to various occasions, thus proving that the training they had received was indeed worth while.

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Productivity of Education

Even agriculture is, in the final analysis, less productive of wealth than is education, for there are many instances of fertile regions lying undeveloped on account of the ignorance of the people. Natural resources do not guarantee wealth in the absence of intelligence. It has been estimated that a pupil's time is worth ten dollars a day in attendance at school, to such extent is earning power increased by securing education. States and nations in which education has reached a high level become wealthy. This may be illustrated in the development of Denmark, where the technical and folk high schools have raised the farming class to a high level of vocational and cultural intelligence. Good schools in a community raise land values. Better schools have been established in some communities in North Dakota at least partly from the motive of increasing real estate values. Schools and colleges in our cities are an important factor in values. When the absolute creation of wealth is under consideration, the ordinary commercial and industrial occupations must yield first place to the work of the teacher. This truth might well be recognized in a substantial way in these days when teachers are trying to live on pre-war salaries. There should not only be a restoration of the purchasing power of the salaries paid before the recent doubling of the cost of living but there should be actual increase of pay. Teaching, which makes money for society, should afford some for the teacher too.

The Teacher's Influence

In the labor conference called by President Wilson there were no teachers among the twenty-two representatives of the public. No educator is found among the thirty-six men and women of the reconstruction commission of New York State. Teachers seem to be overlooked for appointment to positions dealing with social reconstruction. This is disappointing in view of the belief of teachers that their influence is potent. The absence of educators from conferences is the more deplorable because of their acquaintance with psychology and their humanitarian attitude. The viewpoint of discussion would be improved through the presence of men and women accustomed to educational problems, for most of the problems of society are essentially educational.

A New Handbook of North Dakota Plants

The plants of North Dakota have received but little attention in comparison with those of many other states. Until the present time there has been no single book describing all of the plants of the state in either a scientific or popular way. For the eastern states there are many books on wild flowers, and two modern botanical manuals besides an illustrated one of three volumes. These manuals describe most of our North Dakota species but not all of those which grow in the western part of the state. The popular books are especially unsuitable as they describe very few of the prairie plants. In the same way we have several books which describe western plants but not eastern.

This lack is now filled to a considerable extent by a "Flora of North Dakota," published in the sixth biennial report of the agricultural college survey. The work is based chiefly upon the collections at the agricultural college and was prepared by Mr. H. F. Bergman, assistant botanist from 1908 to 1912. The book is scientific rather than popular, but an effort has been made to make it as simple as possible. Neither illustrations nor complete descriptions are given, but there are descriptive keys which will enable one to identify any of the flowering plants and ferns of the state. Numerous notes upon the distribution of the plants in the state are given and also upon the variable forms of many of the species. The introduction contains a review of botanical exploration in the state, nature of its vegetation and instructions as to the use of the keys. An index and dictionary of botanical terms are also included. On account of the difficulties of printing such a work a few errors occur, but a list of these has been prepared to accompany the copies.

It is noteworthy that North Dakota is the first state in this region to have such a publication, a very similar one of Colorado being the nearest. The report contains also an article by the same author upon the plants of Barnes county. The flora covers over 200 pages and lists about 960 species of plants. It will be of value to teachers and students of the schools of the state. The number of copies is limited, but those who are sufficiently interested to make use of them can probably be supplied. The flora is also published separate from the report. Application should be made to the department of botany.

The County Library System

This is the latest and by far the most successful type of rural library work. It originated in Ohio, and one of the best known activities of Van Wert county, Ohio, is the Brumbach library. This library, whose building was given by Mr. Brumbach several years ago, is supported by county taxation, and is the center for a library service which reaches all parts of the county. Fifteen country storekeepers are its "branch librarians," and 101 rural school teachers are the custodians of its schoolroom stations. In 1913 there were 115,550 registered borrowers, besides 2,435 school borrowers. Over 90,000 books were loaned in one year.

In Oregon the county library system has also been most successful. In Multnomah county, the Portland public library acts as the central headquarters, and carries on a system of traveling libraries to a chain of country stores and schoolhouses. Several of the other counties have organized the service.

It is in California, however, that the county system has been carried out on such a large, carefully planned, and satisfactory scale as to excite the interest of the whole country. The entire state will soon be covered by the system, each county catching the enthusiasm from its neighbor. The county is the unit, and each county organizes on its own desire, taxes itself, appoints its own librarian, buys the books it wishes, and carries on its work without let or hindrance. California started with a state system of traveling libraries several years ago, but distances are great, and the difficulties of operating one service in a state which is 700 miles long, proved the need of a plan which would bring the organization nearer to the patrons. In the county system, the county headquarters is within a day's ride of the stations in nearly all cases.

The chief point of excellence of the California system is that it operates under a state law so full and complete as to cover every contingency that may arise; allows for a flexible cooperation and even consolidation between county and public libraries, as local needs may suggest; and, best of all, provides that when a county adopts the system it must automatically levy a tax upon itself, just as it does for public schools, sufficient to carry on the service in an adequate manner. This tax may be as much as one mill on each dollar of assessed valuation of the county.—From Foght's The Rural Teacher and His Work.

The Secondary School and Microbiology

Casper I. Nelson, Professor of Bacteriology.

Believing that which we cannot see is indeed difficult with most of us but this is no argument against the teaching of the invisible. It merely expresses the fact that "we have eyes and see not." The writer spent some valuable time teaching in a rural school and knows from experience the terrible monotony of the multiplication table continued day in, day out. Oh, for the diversion of a little intruding canine visitor to laugh at! And especially so when the drifting snows compel the abandonment of the outer world for the vicinity of the ventilating stove. Then the entire world of knowledge is of the canned variety and must be extracted from books or charts by the discouraging use of mental can-openers.

Since that day the writer has had many different experiences as a result of which it would seem a real pleasure to be cooped up once more in the old school house with a dozen or two fresh, unsophisticated, wondering minds to work upon.

"Eyes that see not"—blind to a world of tiny organisms busily preparing food for us, busily tilling the soil; busily striving against powerful counterforces, — everywhere, on furniture and furnishings, on our hands, in our mouths, and floating before our unseeing eyes. What a wealth of diversion for naturally curious little minds. Here is an answer to many a recurrent "why?"

It is my purpose to state the possibility of a nature study in secondary schools which will be suited to conditions found there, and which will be of practical value and within the grasp of the rural teacher and pupil.

First of all the teacher should be led to realize the possibilities. These can be revealed only by those who know,—extension divisions, colleges, superintendents and speakers at conventions. Next the teachers should be furnished literature such as has been issued by the Cornell University extension division for its reading courses, as Household Bacteriology, (Vol. II, No. 31, Sanitation Series, No. 2, Jan. 1, 1913), and Report of the Biological Dept. of New Jersey Agr. College Exp. Station, 1898. On the school bookshelves there should be Lipman's Bacteria in Relation to Country Life, Elliot's Household Bacteriology, Conn's Agricultural Bacteriology, The Story of Germ Life, and Bacteria, Yeasts and Molds in the Home; also Public Health, Marine

Hospital Service Bulletin No. 56—Milk in Its Relation to Public Health.

A brief survey of fields for study by teacher and pupils may be of service here. Materials to study are at hand on all sides, in and about the things most intimately connected with our daily life and habits. The mere mention of these materials will seem trivial, so little used are we to consider them interesting. Our food, such as cheese, milk, fruits, roots, bread, meats, pickles, and kraut abound in bacteria. Bacteria infest the soil, dust in the air, our bodily excretions, the pores of our skin, our hair, mouth and nostrils. We carry them under our finger nails and in tooth cavities. They are found in ensilage and on hay. They are everywhere. These germs can be cultivated and studied with a very little inexpensive equipment. The desirable compound microscope suggests the greatest difficulty in the entire plan. If there is no extension department at the nearest state institution, where "knock-down" compound microscopes can be obtained for short loan periods, it might be necessary to engage the philanthropic interest of the local physician, or worse still, it might be necessary for the school district to make a purchase. This outlay of $65 to $85 may come hard. It should not be considered an unreasonable request on the part of a teacher, however, any more than should a request for a blackboard, a globe, or an encyclopedia. Such an instrument would be a wonderful addition to the equipment, and good for years.

Any college extension department should be equipped to take care of unusual scientific wants of rural and other secondary schools as a matter of extension education. Such a suggestion as that of having microscopes to loan should be met with favor. Another suggestion is to have little cabinets containing alcohol lamp, bottles of the three principal basic dyes, and pipettes, and with such small apparatus appropriate directions for their use, loaned to school districts on the circulating library plan.

From school supply houses the teacher can obtain a few test tubes, petri dishes (low flat round glass dishes about one inch deep by four in diameter, in pairs so that one serves as a cover for the other), slides and cover slips, and a pound of agar shreds. The agar shreds can be obtained from the local druggist, as well as some cheap dyes. Aqueous solutions of dyes will serve very well.

With ingredients ordinarily available, and the agar shreds, or cooking gelatine, a sort of beef-broth jelly can be concocted at the kitchen stove. The ingredients are beef juice, salt, a pinch of soda, and the agar, boiled to the consistency of a jelly. The nutrient jelly once prepared can be poured into the thoroly cleaned test tubes, plugged with cotton batting and sterilized by steaming three successive days, twenty minutes each time, in the wash boiler. Tin cans serve beautifully as holders for the test tubes. Now the petri dishes (sauce dishes covered with clean pieces of window glass may be used for substitutes) are sterilized by baking for an hour in the range oven. These dishes are now used to receive test-tubefuls of the prepared and sterilized nutrient jelly, and when the jelly is hardened again, the dish is exposed, uncovered, for a short time, to catch settling dust parachutes.

It will be found in this way that dust is a wonderful garden wherein many interesting species of micro-organisms may be found. Where each little mote of dust settles on the nutrient jelly a tiny round speck appears about twenty-four hours after the dish containing it has been set aside in a warm, dark place for it to incubate. These specks or colonies of "germs" grow larger and larger. Beautiful reds, greens and violets appear. Downy little spots which every housewife would recognize as the mold so common on bread, cheese and sauce are to be seen.

With this wonderful little garden at hand there need be no tedious recesses, no gloomy afternoons. The microscope will need be rationed and a guard placed to keep the peace. The teacher will need to keep the work firmly in hand to guide and direct the students in the proper direction.

The writer once had the privilege of conducting such a class in a Sunday school for a group of newsies, little "toughs," in one of our larger towns. He found the same thirst after knowledge of the "other world" there and will vouch for the perfect worthwhileness of the entire winter's study.

Other fields of study will be brought to the teacher's attention in such a multiplicity as fairly to bewilder. Cheese, milk, soil, water, cider, preserves, yeast cakes, bread, clothing, animal refuse, will all demand attention and will require detailed studies of their simplest forms of bacteria, yeasts, molds and protozoa—members of the animal kingdom no larger than the bacteria, which are considered plants.

It is well to consider at this point a general pedagogical method of procedure in any microorganic problem. The natural mind works in about this way:

1. First the question, "How do bacteria look?" The teacher should have at hand from the extension division prepared slides of the commonest type forms. The type forms—three in number—should be illustrated by "germs" from the walks of child life, i. e., "matter" (meaning pus), hay-water, infusoria from stagnant and "spoiling" juices, etc.

2. "How big are bacteria?" Prepared slides of yeasts and molds should be shown to give a comparison of sizes, and the three magnifications of the compound microscope used in such a manner as to give an idea of the extent of magnification. Comparison with very small things in the experience of the child should be made.

3. "How do bacteria act?" Show them bacteria in their motile condition. This will be no end of amusement. Wheat seed left to soak for days until it begins to "smell" furnishes abundant material in every drop of the liquid.

4. "Where are bacteria found?" This is the point of research. Develop the idea that they are found everywhere. An interesting experiment is to prepare tubes of nutrient broth (without the agar) sterilized as described previously, to which scrapings from the teeth, sweat, saliva and hairs, are added. If the teacher can prepare simple slides of these growths, for the pupils the idea of the widespread distribution of bacteria will be accomplished. Incubate such tubes in a warm place for 24 hours.

5. "What do bacteria do?" Discuss and show how they feed and what they require and what changes they bring about, both beneficial and harmful.

6. "How can we deal with bacteria?" Here take up the germ theory of disease, and disinfection, sanitation and counter measures for disease control, as well as measures to take for the maintenance of personal and public health.

The above outline undoubtedly represents more work than could be covered in one year. Yet any portion of it is a complete unit in itself and represents an advance over present conditions of nature study.

It is not possible in such an article as this to embody the subject matter. That the teacher must obtain from her own ingenuity or from more complete texts such as have been named. However the subject "microbiology" is meant to include not only bacteria but yeasts and molds as it is almost impossible to separate the three in the average mind. Illustrations of practical problems and suggested methods of handling follow.

The bacteriology of dusting:

1. Prepare six or eight dishes (petri dishes) of nutrient jelly (agar) in a manner to preserve their sterility.
2. Expose one or two plates in the school room for five or ten minutes to catch dust germs.
3. Now use a feather duster vigorously and expose two other plates in the same manner as before.
4. Incubate all plates an equal period of time (24 hours) and make a direct count in each case of the number of colonies found. An excellent incubator is furnished by any chicken incubator or even by a home-made fireless cooker heated to the temperature of lukewarm water.
5. What is the effect of the feather duster?
6. Now repeat after the effects of the feather duster have all disappeared, using an oiled dusting cloth instead of a feather duster.
7. Which is the better method of dusting?

The bacteriology of sweeping—right and wrong ways of sweeping with a broom:

Method of study similar to preceding problem.

To estimate the number of bacteria in milk:

1. Sterilize a quart milk bottle in the oven using a cotton plug as a stopper.
2. Fill the bottle when cooled with water boiled 10 minutes in the teakettle. This represents 1,135 cubic centimeters (give the arithmetic class drill on the metric system and equivalents).
3. When the water is cooled add to it one level teaspoonful of good well mixed milk, the spoon having been previously sterilized by heating.
4. Stopper the bottle with a clean paper cap dipped in hot paraffine. Invert bottle completely twenty times.
5. Remove one teaspoonful of the diluted milk from bottle to a sterile petri dish and mix well with melted agar cooled to the point at which it does not burn the cheek when held close to it in the test tube. Let harden in a level place. Incubate 24 hours at blood heat. (What is it?).
6. If a teaspoonful is 4 cubic centimeters what fraction of the original teaspoonful of milk is in the petri dish?
7. Count the number of colonies after 24 hours incubation and compute the number of bacteria in a cubic centimeter of milk.
8. Repeat the experiment using dirty milk.
9. Keep test tubefuls of each sample of milk and study their keeping qualities, curd, taste and odor.
10. Draw conclusions.

A textbook offering a course of such problems worked out in completeness should be available for the teachers and pupils but unfortunately has not been prepared as yet.

In connection with all these problems there are many opportunities to unite the work with arithmetic, geography, physiology, composition, and spelling. It need not therefore be a valid objection that there is no room in the school program for this "new study." It is not a new study. It is an old one applied in a new way. There is no older need than that of health propaganda and sanitation. What is the mysterious now can well become the well known.

Summary:

There is a need of a study by the "laity" of the ever present, all surrounding, ceaselessly active "under-world" for the purpose of giving a rational basis to much observed but little understood processes in nature, such as "rotting."

The logical place for this is the school room where the natural curiosity of the child mind offers the materials for a research laboratory. Such a study links all branches of knowledge in one. It approaches a basis for "general science." The materials are plentiful and at hand. Only a small monetary outlay is necessary. The teacher in our rural schools is at present unprepared along these lines but could be prepared by the workings of a state health educational program. That such a health educational program is urgently needed at the present time is a matter that does not need demonstration. In the mind of the writer the science of microbiology is not a thing peculiarly fitted to curricula of higher educational institutions alone. The "germ" has come to stay in the vocabulary of every man.

The History Department

At the beginning of the school year the history department was reorganized and placed under the management of Dr. Earle D. Ross, who comes to the college with high qualifications for this position. For several years he was assistant and fellow in American history in Cornell University. Later he held positions as instructor in history and the social sciences at Syracuse University; Muhlenberg College, Missouri; Wesleyan College; Simpson College, and Illinois Wesleyan University.

The aim of the department is so to present the subject of history as to give students an understanding of present day problems and institutions as viewed from a historical background. Emphasis will be placed upon social, industrial, and political problems. During the past war and in the period of reconstruction there has been a growing feeling that history should be more efficient and should train citizens in right ideas and in appreciation of government and what it should stand for. The consensus of opinion today is that one of the chief aims of the whole educational system, and of history especially, is to train for citizenship. National, international, and world problems are demanding more and more attention in the modern classroom. The tendency today is to avoid questions dealing with narrow nationalism. History deals with the broader questions of life and in the presentation of the various phases of the subject it is aimed to show how it will affect the lives of the students most directly.

There are three general aims that will be adhered to in the work in history during the year. The first is to give general courses which will acquaint students with the main facts in modern history. This great mass of facts is something which every person should and must know if he is to understand modern problems and institutions. The second aim is to offer courses which will meet the demands of more technical students in economic and agricultural history. A thoro knowledge of these subjects is important and should receive especial emphasis in an agricultural college. The present problems in agriculture can have much light thrown upon them by a study of the past. The third aim is to cooperate with other institutions and with federal agents in carrying out investigations. The Carnegie Institute at Washington, D. C., and the American Agricultural Historical Society are at present carrying on extensive investigations dealing with agricultural history.

The history, as presented in the high school, will be complete in itself. At various periods in the past the tendency was to deal with high school history as a preparatory subject fitting the student for college. Statistics show that a large majority of students never enter college. With this fact in mind, the teaching of history will be made as complete as possible.

Several short but complete courses in history have been outlined for the short course students. Emphasis will be placed upon the great fundamental principles and national issues rather than upon wars, political parties, etc. The chief elements of United States history will be considered and the study of the past in relation to the present will receive the most consideration.

The Department of Social Science

At the beginning of the school year the subjects of social and economic science were separated from the history department. Dr. A. F. Hunsaker was elected as head of the department of social science. He comes to the school with high qualifications for this position. He is a graduate of the State Normal University of Illinois and of the University of Illinois, and has studied at the University of Wisconsin and Columbia University. His Ph. D. degree is from the University of Illinois. During the past year he was assistant in economics at the University of Illinois. From 1910 to 1914 he was an instructor in the University of North Dakota.

The work in this department will be developed as the need for it arises. Conditions in North Dakota today demand that the social and economic phases of life be related to agriculture rather than to commerce or manufacturing. The tendency in many of the schools of higher learning is to place the emphasis in the social sciences upon the commercial phases of life. This will not be the policy of this department during the present school year. It will aim to show the close relationship between the study of the social sciences and agriculture with consideration of all industries. In shaping all courses in the department the relation of the social sciences to the future life work of the students will be kept in mind. It is aimed to affiliate the work of the department with national societies. Cooperation with other departments of the institution and with state and national organizations will receive consideration.

COLLEGE NOTES

Enrollment

The fall term started September 23 with much the largest opening enrollment that the institution has ever enjoyed. The end of the first week showed 455 in attendance against the best previous record of 306 for the same time. At the present time, the end of the fifth week, the enrollment is 744 as compared with the best previous record of 530 for the same time. Particularly gratifying is the collegiate enrollment of 345 with a freshman class of 172. The enrollment in the sophomore class is 78; in the junior class 52 and in the senior class 26. There are 5 postgraduates and 12 specials. The high school shows an enrollment of 162 and the industrial courses 237, with the power machinery and farm husbandry curricula proving about equally attractive.

New School Organized

Those departments which have heretofore been without group organization, serving as supplementary departments to the other schools, have now been organized into the school of science and literature and Professor A. E. Minard has been appointed chairman of the school.

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COLLEGE AND STATE

NOVEMBER—DECEMBER 1919

Vol. 3 No. 6

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The North Dakota Agricultural College
Fargo, North Dakota

Entered as second class matter, February 13, 1917, at the post office at Agricultural College, North Dakota, under the act of August 24, 1912.

COMMERCIAL TRAINING

Commercial training has been reestablished at the North Dakota Agricultural College and instruction is given in the following subjects:

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Penmanship	Typewriting
Commercial Law	Accountancy

While all of these subjects will be taught in their more general aspects, particular attention will be given to elevator accountancy, combining the work of the commercial department with that of the department of grain grading and testing.

WINTER SHORT COURSES

in

Agriculture
Auto Mechanics
Domestic Science
Elevator Management
Tractor Operation
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These all begin January 5th.

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The North Dakota Agricultural College

THE COLLEGIATE DEPARTMENT OFFERS THE FOLLOWING CURRICULA THAT LEAD TO THE BACHELOR OF SCIENCE DEGREE:

Agriculture, Architectural Engineering, Architecture, Biology, Chemical Engineering, Chemistry, Civil Engineering, Education, General Science, Home Economics, Mechanical Engineering, Pharmaceutical Chemistry, Veterinary Medicine and Surgery.

Graduates from first class high schools are admitted to the freshman class of all curricula.

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For admission to the curriculum in Practical Pharmacy, an applicant should have completed the equivalent of two years of high school work.

For admission to the other industrial curricula and to the high school, the applicant should have completed a good common school training.

The above curricula are all practical. The training given is the kind that the world demands. In this time of extraordinary national need, the value of this type of training is especially outstanding. Accordingly, there is ever an unsatisfied demand for capable graduates from these curricula and especially so now.

Military drill is required of all able-bodied male students for at least two years. This, however, does not put upon these young men any military obligation that does not rest upon all other able-bodied young men. It simply prepares them for more efficient service and for more rapid promotion whenever they are called in regular order. Two years of advanced work that includes training along the lines of military engineering and that puts a young man in line for appointment as second lieutenant in the regular army may be elected upon completion of the required work.

The winter term opens January 5th for all curricula.

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